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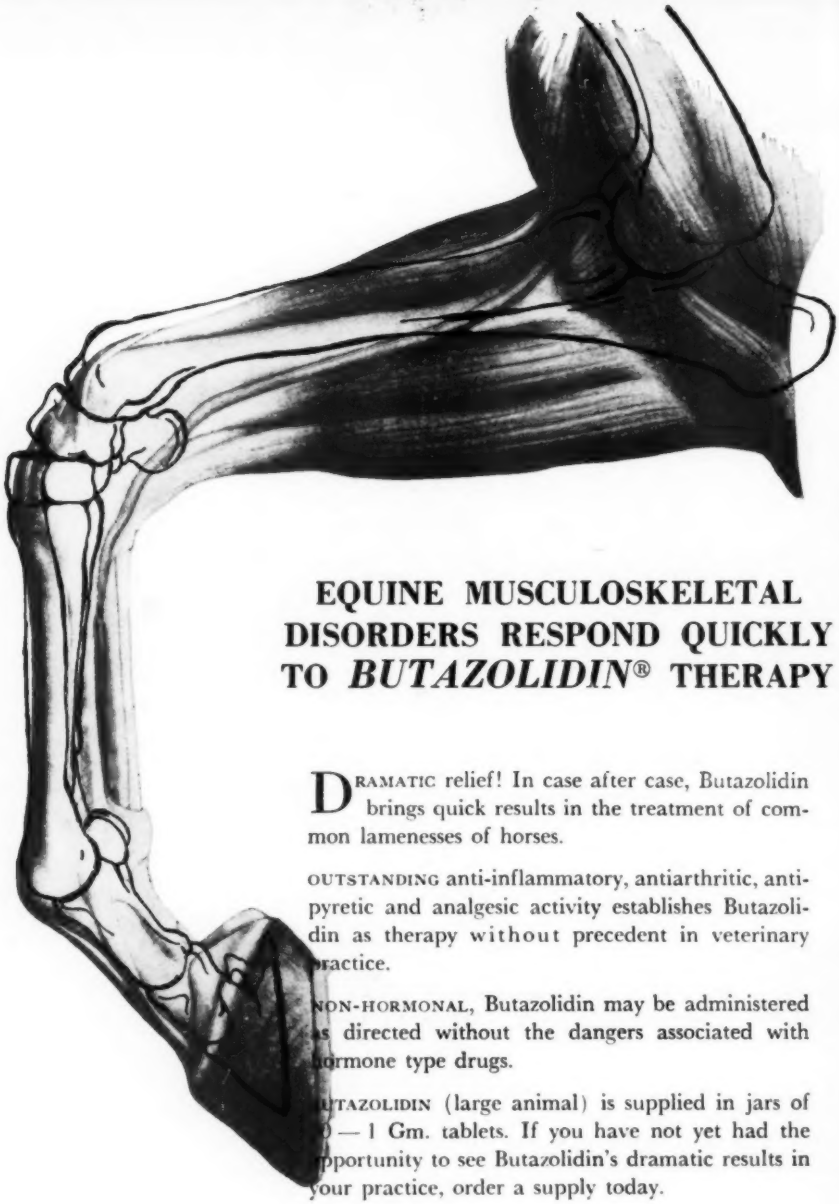
IN THIS ISSUE

Use of Chlorpromazine in Swine
The Drug Store Animal Health Department
Chromobacterium violaceum Infection in Swine
Blastomycosis in the Dog
Restraint of Small Animals
Improvement in Dental Care

Complete Index on Page VI

INV '60



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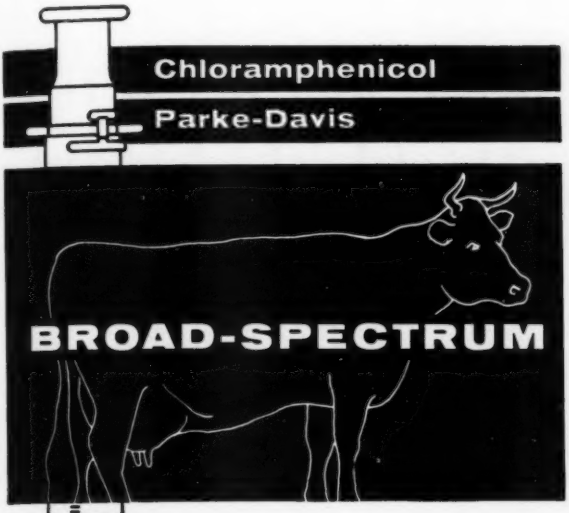

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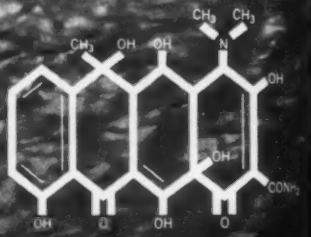

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General Practice

Use of Chlorpromazine in Swine 571

C. M. HIBBS, D.V.M.

Clinical experiences indicate that chlorpromazine administered intravenously in "frenzied" sows at farrowing time may prove beneficial in helping sows farrow naturally.

The Drug Store Animal Health Department 573

JOHN H. COLLINS, D.V.M.

The Food and Drug Administration viewpoint on drug store traffic in pet and animal health products is presented. The writer covers legal and ethical aspects.

Chrombacterium violaceum Infection in Swine 578

E. M. ELLIS, D.V.M., M.S., Ph.D. and WILLIAM F. SCHROEDER, D.V.M.

Recent outbreaks of pneumonia in swine in the Georgia Coastal Plains area prompted the writers to again review the nature of the responsible organism with its predilection for lung tissue.

Leptospiral Antibodies in Missouri Veterinarians 581

HUGH B. HIGGINBOTHAM, M.A., HERBERT S. GOLDBERG, Ph.D. and J. T. LOGUE, M.D.

Little clinical human leptospirosis in the face of increasing incidence of the disease in livestock prompted this investigation to determine reaction level in veterinarians.

Worm Parasites of Cattle in New Mexico . 586

WILLARD W. BECKLUND, M.A. and REX W. ALLEN, M.S.

Postmortem examinations of Arizona and New Mexico cattle revealed nine species of gastrointestinal nematodes.

Proteolytic Enzyme Therapy in Bovine Practice 591

W. L. BAKER, JR., B.S., D.V.M.

Proteolytic enzymes administered to bulls with chronic infection of the larynx-pharynx regions proved effective in cases reported here.

Immunization of Cattle Against Leptospirosis 611

R. W. H. GILLESPIE, Ph.D. and S. G. KENZY, D.V.M., Ph.D.

This is the second report of three on immunization. Evidence is presented to indicate that vaccinated heifers retain immunity for as long as 20 months after vaccination.

Small Animal Practice

Blastomycosis in the Dog 595

GRISELDA F. WOLF, D.V.M., M.S., ROBERT M. SCHWARTZMAN, D.V.M., and JAY H. SAUTTER, D.V.M., Ph.D.

In review and presentation of additional reports, emphasis is placed on radiological findings and histopathological examination of ocular lesions.

An Ultra Short-Acting Anesthetic 601

LEO L. LIEBERMAN, D.V.M.

This anesthetic has as a primary advantage short duration of action. It is a versatile for intravenous administration.

Restraint of Small Animals 604

JACK O. KNOWLES, D.V.M.

Restraint of small animals can be accomplished with inexpensive apparatus and at the same time be acceptable to clients.

Improvement in Dental Care 606

E. E. CHAMBERS, D.V.M., FRANK K. LOVE, D.V.M. and TERRY B. GRAY, C.D.A.

The writers report on general clinical application of technics that improve the small animal practitioner's service to clients and animal patients.

Effect of Varying Doses of Piperazine Citrate on Puppies 609

J. GREENBERG, M.S., W. E. SEYMOUR, D.V.M. and A. F. McEWEN, V.M.D.

A drug completely effective against ascarids is discussed here.

Editorial Comment

Anomaly in the Chicken 580
J. M. DELPHIA, M.S. and R. F. SHUMARD, Ph.D.

Liquid Protein Supplements 585

Seaweed Feed Additive 585

Lymphatic Leukemia in a Shetland Foal . 590
J. O. FOSS, D.V.M.

A Half Century of Progress 593
E. T. BAKER, D.V.M.

New Cases of Bat Rabies Reported . . 603

Biological Investigations 608

Veterinary Education and Changing Demands of Practice 619

Blood Coagulation Time 622

Soviet Veterinarians Tour the United States 623

Reader's Service XXX

Veterinary Calendar XLVII

Vol. 53 November 1958 No. 11

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CANINE URINARY AND RESPIRATORY INFECTIONS

Robert M. Stone, D.V.M.

The writer reports on a combination of antibiotics formulated for small animal patients on a milligram-per-pound basis. In clinical cases involving urinary and respiratory infections, the combination was effective and safe.

THE AVIAN LEUKOSIS COMPLEX

Paul M. Newberne, D.V.M. and Charles J. Vosbrink

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C. D. Van Houweling, D.V.M.

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1. Charles Raker, V.M.D., Professor of Veterinary Surgery, University of Pennsylvania. Annual Meeting of the American Veterinary Medical Association, Aug. 18-21, 1958, Philadelphia, Pennsylvania.

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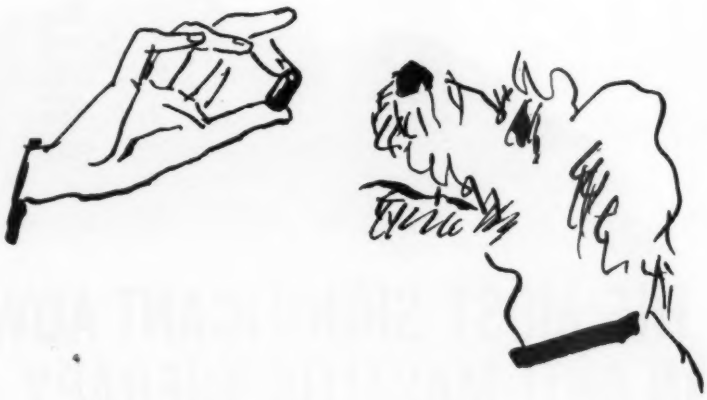

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1. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 2. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

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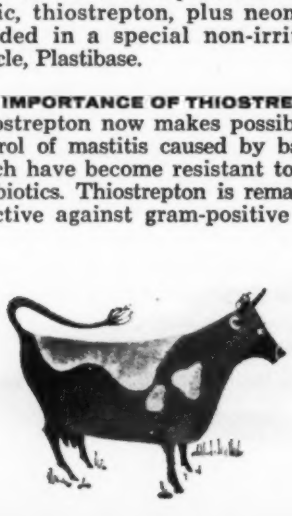

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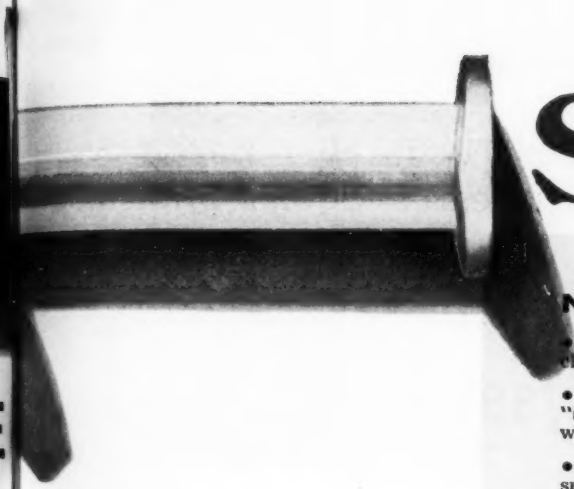

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News Comment

Dairy Trends

Larger dairy herds and even higher production are indicated for at least another decade, according to dairy farmers questioned at the recent Ohio Experiment Station Dairy Day. Operators answering the questions owned an average of 31 cows each. They expect herd size to increase 62% within ten years. Production, they believe, will go up 35% during the same period.

At least 40% of the group now have bulk tanks; 84% expect to have them in the next decade.

Cecal Coccidiosis

Glycarbylamide and nicarbazine have proved effective against the poultry disease, cecal coccidiosis, according to report by Dr. Don K. McLoughlin, Animal Disease and Parasite Research Division, USDA. In controlled tests with six drugs, birds fed glycarbylamide-medicated mash showed better weight gains than controls. Although this suggests a growth-promoting property in the compound, further testing will be required before findings can be substantiated.

Nutrition Studies

Rauwolfia and hydroxyzine fed to cattle and lambs at levels too low to cause sedation resulted in improved growth and feed efficiency. Results were obtained by Dr. W. C. Sherman and coworkers in what are believed to be the first nutritional studies on tranquilizer effects on ruminants. Direct effects of these drugs on metabolic process as well as their influence on the central mechanism controlling growth are still being studied.

Urinary Calculi

Salt may be the means of preventing urinary calculi in sheep, according to recent English experiments. In controlled tests, 14 of 60 wether lambs developed urinary calculi after they were fed all they would eat of experimental rations. No calculi developed in 30 sheep fed the same ration plus 10% salt.

Anemia in Mink

Raw fish may be implicated as the cause of anemia in mink, according to a report by two Norwegian scientists of the Norwegian Veterinary College, Oslo. Mink fed raw coalfish and whiting developed anemia in experimental studies, whereas young mink or kits fed boiled fish exhibited no signs of the blood disease. Possibly there is a "heat-labile factor capable of producing anemia, probably an enzyme in the raw fish." Catfish and blue halibut, on the other hand, produced no effect when fed as uncooked diet.

Meat-type Hogs

Meat-type hog strains are gaining ground in Iowa, according to Dr. Ralph M. Durham, Iowa State College. "Evidence of this trend," he said, "was the fact that a Chester White boar topped the sale of meaty hogs meeting standards of the Iowa Swine Testing Association recently. Chester White boars have been entered in the tests since the beginning two years ago. They did not have a head start on meatiness like some breeds."

Wet Grain

Cows eat wet grain about 20% faster than dry grain, according to research conducted at Michigan Agricultural Experiment Station. Many dairy cows require twice the time to eat their grain as it takes to milk them in a milking parlor. Adding water to grain should cut down eating time. An amount of water equal to at least half the volume of grain can be added to the grain.

Fly War

Bacteriological warfare may prove to be the answer in the age-old battle against the housefly. A living insecticide has been developed that will give the housefly a disease — Bacillus thuringiensis Berliner — which strikes the fly during the maggot stage. When available, it will be in powder form. Dried bacteria will be mixed in soluble "carrier" which can be used as a dust or dissolved in water to make a spray. Possibility of adapting this unique idea to other insect problems will be explored.

Sperm Shipment

Using a new storage method, a shipment of chicken sperm to Israel recently signaled the first breakthrough in this field, according to Dr. Frank H. Wilcox, University of Maryland scientist. Doctor Wilcox obtained 38% fertility of eggs produced. Sperm was used 38 hours after being taken. Previously, storage of semen for more than 24 hours resulted in almost complete loss of fertilizing power.

Semen was shipped in ice by air. Development could be of great value since semen can not transmit the diseases of poultry into clean areas as live birds may.

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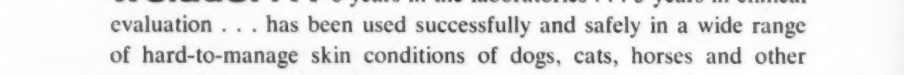

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Chlorpromazine administered intravenously in so called "frenzied" sows at farrowing time has proved beneficial. Clinical reports indicate that sows farrow naturally after appropriate therapeutic dose of chlorpromazine.

Use of Chlorpromazine in Swine

C. M. HIBBS, D.V.M.

David City, Nebraska

REPORTS ON USE OF TRANQUILIZERS for various conditions in many types of animals have become a part of the literature during recent months. Little information, however, has been made available regarding the use of these compounds in swine practice in America. Williams and Young[1] reported on the use of perphenazine in a large number of cases in swine, but only limited data on individual cases were presented. Kristjansson[2] reported in Canadian literature on the use of chlorpromazine in four cases of sows showing extreme nervousness and savageness. Ritchie[3] in English literature reported on the use of chlorpromazine for several different purposes, using various routes of administration.

This restraint and control of the so called frenzied sow has troubled the veterinarian involved in swine practice for years. Morphine derivatives have been used with poor results. Certain of the barbiturates have been employed and found to cause depression in pigs if administered to sows at farrowing time. Physical restraint has been utilized and proved unsatisfactory.

In the opinion of this writer, traquilizers show promise, particularly when administered intravenously. In order to administer the compound in this manner, the animal is caught with a nose catcher and held by an attendant. A rubber band is placed tightly around the base of the ear. The area over the vein is scrubbed with soap and water or alcohol. Most swine ears have an area where two veins join; this provides a choice site in which to introduce the needle without difficulty. A 20 or 22 gauge needle is introduced bevel down with a slight degree of negative pressure. As soon as blood enters the syringe, the rubber band is removed, and the desired amount of compound injected. In certain animals this procedure is rather difficult because the ear may be notched. Also, some breeds have thick ears, which complicates administration. The following are a group of case reports which are typical of many observed in practice, in which chlorpromazine (Thorazine—Pitman-Moore) has proved beneficial.

Case No. 1. A Chester white gilt weighing approximately 290 lb. was presented. The owner reported that the sow had farrowed and killed some piglets before he could remove them from the pen. The sow was nervous and refused to lie down for pigs to nurse. Following examination and

observation, 75 mg. of chlorpromazine was administered intravenously. The sow became quiet and lay down, but when a gilt in the adjoining pen was treated, sow no. 1 became restless and got up again. Another dose of 75 mg. was administered intravenously and 50 mg. injected subcutaneously. After a short time the sow lay down and permitted the remaining pigs to nurse, all of which were saved.

Case No. 2. A Chester white gilt in a pen next to case no. 1 had killed some pigs and was extremely vicious. The gilt weighed about 275 lb. and was given 75 mg. of chlorpromazine intravenously. Thirty minutes later the sow was treated with 100 mg. intravenously and 75 mg. subcutaneously. Following this treatment the sow promptly became quiet and permitted pigs to suckle.

Case No. 3 A Hampshire gilt farrowed about 4 a.m., was restless and apparently had agalactia. About 9:30 a.m. 75 mg. of chlorpromazine was administered intravenously and purified oxytoxic principle was injected subcutaneously. Prompt milk letdown was noted. Rapid response observed in this case suggests that chlorpromazine may have a lactogenic effect in sows. However, lactation did not persist, and pigs were put on an artificial ration 48 hours later.

Case No. 4. A Hampshire gilt at farrowing had attacked some of the pigs. Chlorpromazine (250 mg.) was administered intramuscularly. After drug had begun to act the sow picked up pigs but did not actually eat them or injure them severely. It took about one hour for the tranquilizer to take effect after being administered by the intramuscular route. The clinical sedative effect of the drug lasted for about 12 hours.

Case No. 5. A crossbred Yorkshire gilt of about 350 lb. body weight was presented. This gilt had farrowed ten pigs. Chlorpromazine (75 mg.) was administered intravenously at 10:30 p.m. The sow delivered three additional pigs while under the influence of chlorpromazine. The gilt exhibited effects of the drug until 8:00 a.m. the next morning. Pigs nursed and the sow ate normally after treatment.

Case No. 6. A crossbred Yorkshire gilt in a frenzied condition at farrowing was presented. The sow weighed approximately 300 lb. Chlorpromazine (75 mg.) was administered intravenously. The animal became quiet a few minutes after injection of the compound. The gilt settled on its sternum. After the gilt was rolled on its side and held for a short time, it accepted the pigs and permitted them to suckle.

Case No. 7. A Hampshire gilt in frenzied condition at farrowing was presented. Chlorpromazine (100 mg.) was administered intravenously. This dosage was indicated because of pronounced nervousness. Pigs were returned to the sow in about ten minutes. The sow was restless the next morning, but no additional treatment was necessary.

Case No. 8. A Yorkshire sow with prolapse of vagina and rectum was treated. Chlorpromazine (125 mg.) was administered intravenously. The animal was securely held by the tail and hind legs. Vagina and rectum were replaced. The rectum was sutured using purse string suture. Two mattress sutures were used to close the vulva. This was accomplished with little apparent pain.

Summary

The case reports presented here serve to indicate the following:

1. Chlorpromazine can be administered safely to sows using a broad range of dose levels.
2. Intravenous administered of chlorpromazine will produce prompt action and is the most economical.
3. Chlorpromazine may have lactogenic effect in certain sows, possibly due to reducing tension which is followed by normal letdown of milk. More clinical evidence is necessary, however.
4. Sows will farrow pigs naturally after a therapeutic dose of chlorpromazine.
5. Chlorpromazine does not inhibit appetite or thirst of sows.
6. Evidently the more intense the condition of frenzied sows, the larger the dosage necessary to quiet them.

Acknowledgment

The assistance of Dr. J. H. Mogilton in preparing this report is acknowledged.

Continued on page 579

A point by point explanation of the Food and Drug Administration viewpoint on drug store traffic in veterinary products is presented here. Legal as well as ethical aspects are covered by the writer.

The Drug Store Animal Health Department

JOHN H. COLLINS, D.V.M.

Veterinary Medical Director
Food and Drug Administration
Department of Health, Education and Welfare
Washington, D. C.

ANY comment on how the Food and Drug Administration views activities in animal health departments of pharmacies must necessarily be prefaced by an explanation of the F.D.A. and what it does.

We are not a police organization, and we do not have direct police powers. We do not make arrests. We are an agency devoted to scientific investigation. Investigations are, of course, aimed at law enforcement, and when our investigations show that there has been a violation of the law, the facts are reported to a United States attorney so that cases can be prosecuted in federal courts. Arrests or service of papers are accomplished by United States marshals and not by Food and Drug Administration personnel.

This is an organization made up primarily of scientists — bacteriologists, biochemists, chemists, pharmacists, pharmacologists, physicians, veterinarians, and other scientists needed to administer intelligently a law which is designed to insure that drugs and therapeutic devices have the quality and properties claimed for them. We need the advice and assistance of specialists in every field of science. With a small organization we can not rely entirely for that advice on our own employees.

F.D.A. is one of several health agencies in the United States Department of Health, Education, and Welfare. To carry out our investigatory functions we have established 16 field district offices in major cities throughout the United States. Each is staffed with a group of inspectors who make actual field investigations and each has a laboratory where most ordinary analyses can be made. In addition to this field organization, we have a headquarters staff in Washington for planning and supervision, and a Bureau of Medicine to give advice on medical questions. We also have in Washington certain specialized laboratories which

Presented at the 9th Annual Meeting of the American Animal Health Pharmaceutical Association, Hotel Kirkwood, Des Moines, Iowa, May 19, 1958.

are staffed and equipped to do analytical work which can not be done in the field and, in addition, the Washington laboratories conduct research on new or improved methods of analysis, and toxicity studies on a great variety of products, including such things as new insecticides, or other chemicals that may find their way into the food supply.

Work of Other Agencies

Before describing further just what we do, I think it would be well to outline some of the things that we do not do.

1. Regulation of advertising (radio, television, newspaper, etc.) is primarily a function of the Federal Trade Commission and not of the Food and Drug Administration.

2. Strict controls exercised over the distribution of narcotics is a function of the Bureau of Narcotics of the Treasury Department and has nothing to do with the F.D.A. except in that we exchange information.

3. A division of the Public Health Service licenses the manufacture and interstate distribution of serums, toxins, vaccines, and similar products, including human blood and its derivatives. The Animal Inspection and Quarantine Division, USDA, renders control over biologicals for animals other than man. We do virtually nothing in the way of investigating the quality or use of products subject to these special laws except on occasions when requested by other agencies.

4. We have jurisdiction only over products which have moved in interstate commerce. A drug which is entirely manufactured and sold within the borders of a single state is not subject to our jurisdiction.

We have, of course, no authority to control or regulate the practice of medicine as such. As you may know, we have on occasion caused the institution of prosecution actions against physicians and veterinarians, but that has always been for something done by the party entirely outside the practice of his profession.

F.D.A. Responsibility

There is some confusion about the area of responsibility of the Food and Drug Administration. Perhaps a good way to explain functions of the F.D.A. would be to outline briefly the provisions of the Federal Food, Drug, and Cosmetic Act which seek to insure the safety and efficacy of drugs, devices, and cosmetics.

Among the most important drug provisions of the Act are those which require informative labeling as to composition, adequate directions for use, and warnings against misuse in cases where such warnings are necessary for the protection of consumers. The Act prohibits any false or misleading statements in the labeling of a drug. Drugs listed in the *United States Pharmacopeia* and *The National Formulary* are required to meet the standards set forth in those compendia. A new drug may not be marketed until acceptable proof of its safety has been submitted in the form of a new drug application. Pre-distribution certification is required for insulin, certain antibiotics, and coal-tar colors used in foods, drugs, and cosmetics.

In addition to the foregoing, the Act of 1938 for the first time brought therapeutic devices and cosmetics under federal regulation. The most important provisions relating to devices are the requirements that they be safe to use in the manner recommended and that they have the properties claimed for them in their labeling. In practical effect, the most important provisions relating to cosmetics is the prohibition against the use of dangerous ingredients.

To get a clear idea of the way we operate, it is important to understand that, with a few exceptions, effective regulation of our drug supply depends upon factory inspection, sampling, and laboratory examination, rather than upon any kind of pre-distribution controls. Instead of providing for registration or licensing of products, the law sets up certain requirements for drugs, as previously outlined, and makes the distributor of drugs responsible for compliance with those requirements.

From the number of inquiries received by the F.D.A. from pharmaceutical associations

and retail druggists, it would seem that only a few are cognizant of legal responsibilities involved in the retail distributors of drugs for animal use.

The most frequent question explores the propriety of selling for veterinary use drugs that are labeled by the manufacturer for human use. Most pharmacists know that the F.D.A. does not object to the filling of a veterinarian's prescription from a bottle which bears labeling for human use and which may even bear the human use prescription legend set forth in the so-called Durham-Humphrey amendment of the Federal Food, Drug, and Cosmetic Act. On the other hand, a pharmacist can not legally sell over the counter a bottle of medicine by simply writing across the container label the statement "For Veterinary Use Only."

The labeling of an article sold over the counter should be completely informative as to composition, adequate directions for use and warnings against misuse. In many instances a pharmacist may be prone to take too lightly his obligation to properly label a product he sells for veterinary use, even when he can legally take a product originally labeled for human use and relabel it for over the counter veterinary use. Some human prescription items are also restricted to prescription sale in the veterinary field. To be entirely safe, a pharmacist is much better advised, if he wishes to deal in products for veterinary use, to buy those products which are already labeled for such use. Not only does this eliminate the problem of deciding which human prescription products can legally be sold without the prescription of a veterinarian, it also eliminates the problem of trying to devise appropriate directions and warnings for the animal use label. Unless he has special knowledge of veterinary medicine, a pharmacist is likely to have difficulty in devising appropriate labeling.

Illegal Sale

A problem we sometimes encounter involves the illegal sale of a drug, which may be sold only on prescription for human use, on the pretense that the customer is going to use it for a veterinary purpose only. To illustrate this point, one pharmacist told our inspector, who had just asked to purchase some sulfonamide tablets, "I can't sell you this drug for yourself but I can sell you some tablets for your dog." He then proceeded to put some sulfonamide tablets in a dispensing container and handed it to the inspector with the statement, "We'll just say this is for your dog, won't we?" While I am sure that no one in this audience would resort to such a subterfuge I would like to point out that practices of this nature are obviously in violation of the law.

"Sold to Veterinarians Only"

Another thorny problem we encounter more frequently concerns animal medications that are labeled with a statement which says in effect "Sold to Veterinarians Only." Some manufacturers who use this statement do not in fact adhere strictly to the sales policy proclaimed and products so labeled sometimes appear in pharmacies, feed stores, and elsewhere. Quite commonly, products labeled in this manner do not bear the detailed information that a farmer or pet owner needs to use the articles safely and intelligently. Under an exempting regulation of the Act, we have considered that a product sold directly to a veterinarian does not need to have the detailed indications and directions needed by the farmer or the pet owner; such a product may be labeled only with the information needed by the doctor in his practice of veterinary medicine. Pharmacists are urged to watch for products in this category, not only in pharmacies but in feed stores and other inappropriate sales outlets. As a representative of the F.D.A. I should advise you to report the facts in such cases to the Administration in Washington or to the nearest F.D.A. District Office. However, I rather think you would be more inclined to inform the manufacturer of the article that his product is being distributed in a manner not intended and consequently is probably misbranded in violation of that section of the Act which requires adequate directions for use.

Dangerous Advice

We have no authority to interfere with, control, or regulate the legal practice of medicine, either human or veterinary. However, as a veterinarian, I would be remiss were I to neglect discussing a matter which has become a sore point and is basically responsible for creating discord between the pharmacy and veterinary professions. A pharmacist's legal right to dispense and merchandise drugs for animal as well as human use should be beyond challenge. However, in their zeal to stimulate sales promotion in animal health departments many of your trade journals encourage you to engage in activities which on the surface seem dangerously close to practicing veterinary medicine without a license. Whether you heed such advice is of course up to you. A few quotations from some journals published for the profession of pharmacy are illustrative:

1. "Keep well informed on up-to-date practices in animal medication and treatment, so that you can provide expert guidance to the farmer."

2. "Maintain a library of animal health literature which you and the farmer can consult."

3. "Distribute animal health literature and promotional material as package inserts in all departments and in your monthly statements."

4. "The store also maintains a complete library of animal health literature, so that knotty questions can be answered on the spot. Mr. _____'s expert knowledge of animal health practices and his personal interest in the problems of the farmer are another big factor contributing to the high rate of sales. He talks things over with the farmer and helps him decide what treatment is needed."

5. "Pharmacists, by and large, have not sensed the need for expert guidance in the selection and use of drugs for the treatment of pets or other animals. The terminology and etiology of animal diseases are a strange jargon of lay terms and scientific language, even as used by many veterinarians, and an understanding of human diseases does not help much in deciphering it. On the other hand the therapeutic approaches used are almost identical: vaccines, sulfonamides, antibiotics, anthelmintics, etc. It does not take long for the intelligent and interested pharmacist to acquire some familiarity with veterinary remedies and the diseases for which they are used. This knowledge often pays great dividends and opens up an area of sales of no small volume."

6. "The . . . Store . . . sponsors animal health classes for local farmers as part of its promotion of animal and poultry health products sold in the store."

7. "Mr. _____ gives personal service to each customer. He maintains a library of animal health literature to help him in discussing animal diseases and their cures."

I could go on, but these few quotations should suffice. No one questions the legal right of an animal owner to attempt his own diagnosis, or the right of a pharmacist to sell that person any drug he asks for provided it is properly labeled and is not restricted by federal law to prescription sale. However, if the pharmacist makes the diagnosis or aids materially in reaching a diagnosis, it may be a different matter under various state statutes regulating the practice of veterinary medicine. Moreover, the pharmacist should realize that when he does so he is engaging in a rather risky affair and may be rendering his customer and perhaps the whole community a disservice. An erroneous diagnosis may result in not only the loss of one animal, but also countless animal and perhaps human lives. Many diseases of animals are highly contagious and many are directly transmissable to man. According to law most of these diseases must be reported immediately to state and federal officials. The patient-doctor-pharmacist relationship with the veterinarian should be essentially the same as that maintained with colleagues in the human field.

Out of Context

I am going to quote a statement out of context to illustrate the evils inherent in quoting out of context and the possibility of making a false statement by putting it into print without checking with proper sources

of information. This quotation is taken from the April 1957 issue of a publication printed for the continuing education of druggists:

"Many druggists are deterred from entering this field (animal health products) because of competition from dispensing veterinarians, and formerly, this was something to be reckoned with. However, developments during the last several years have generated a trend towards the drug store as the dispenser of pet care items. One factor influential in this trend is the constant introduction of new medications with higher unit costs. This has induced veterinarians to write prescriptions and let the druggists do the dispensing and thus carry the burden of investment in medical stock. Fortunately, for the druggists, this does not require any appreciable expansion in inventory, since much animal medication is also prescribed for human beings, varying only in animal dosage. A further advantage for the druggist was provided in the enactment of the Durham-Humphrey amendment to the Food and Drug Act, which released many legend drugs for over the counter sale as animal medications. In the opinion of Doctor Collins, head of the Veterinary Section of F.D.A., druggists may sell these medications without prescriptions when the customer indicates that they are intended for treatment of animals.

Attempted Treatment

"'Every owner of animals,' the doctor stated, 'has the inalienable right to attempt to make his own diagnosis and attempt treatment of his own animals, which are admittedly his own property. He has the right to demand and receive safe and efficacious drugs with which to attempt treatment.'

"Such drugs include the tranquilizers . . . which are recommended for controlling vicious or frightened dogs and cats — fear of thunder and lightening, tendency to tear off bandages and rip out surgical stitches."

My statement taken out of context from an article published in the January 1953 issue of the *Journal of the American Veterinary Medical Association*, together with the ill-considered remarks of interpretation by the author of this "educational" article have placed me in the embarrassing and defensive position of answering some pointed questions posed by not a few mildly outraged colleagues. The real damage, however, lies in the false statement with respect to the tranquilizers. Although the quoted statement appeared in print April 1957, the F.D.A. issued the following press release to veterinary and pharmaceutical journals on Oct. 29, 1956:

"In order to prevent possible diversion to human use of tranquilizing drugs intended for administration to animals, the Food and Drug Administration said today that these new veterinary products will be restricted to professional use.

"New-drug applications for veterinary tranquilizers specify that labels will bear the warning: 'CAUTION: Federal law restricts this drug to sale by or on the order of a licensed veterinarian.'

"It was pointed out that present medical knowledge of the tranquilizers requires that use for humans be under medical supervision."

Changed Thinking

I should say that our thinking in this connection is predicated upon tranquilizers in dosage forms which lend themselves to use in human medication, *i.e.*, those which may be diverted to ill-advised or illegal use for or by human beings. Recent developments in this field indicate that our announced position may necessarily have to be modified if the dosage form is unsuited to human use — for example incorporation in a high-protein pre-mix intended for mixing with animal feeds. In such an instance, however, the preparation would be regarded as a new drug under statutory definition which would necessitate the filing of a new drug application by the manufacturer. Among other things the application would have to prove the absence of drug residues in tissues of slaughtered animals used for human consumption in addition to *per se* safety for the animals intended to receive the drug directly.

CASE REPORT

Chromobacterium violaceum Infection in Swine

E. M. ELLIS, D.V.M., M.S., Ph.D. and WILLIAM F. SCHROEDER, D.V.M.

Department of Animal Diseases
Coastal Plain Experiment Station
University of Georgia

CHROMOBACTERIUM VIOLACEUM *var. manilae*,[1] further referred to as *Bacillus violaceus manilae*,[2] and *Bacillus violaceus*,[3] was described in 1954 by Sippel[4] when reporting several outbreaks of pneumonia in swine. He further showed the isolated organism to be pathogenic for cavias, mice, and swine. In July of 1953 Sippel discovered a pneumonic condition of cattle in one herd which was shown to be due to a chromogenic, gram negative organism resembling *C. violaceum*.

Sneath *et. al.*[5] has listed 13 occurrences of a disease in human beings caused by *C. violaceum*. He also found the organism pathogenic for mice, cavias, and rabbits.

Woolley[6,7] described a strain of the organism which was pathogenic for water buffalo.

Soule,[8] working at the University of Michigan, described two strains of Bacillus violaceus isolated from human beings. Soule[8] warned students not to overlook the possibility of pathogenicity on the part of any organism when it was associated with disease and death.

On Jan. 29, 1958, a dead hog weighing approximately 100 lb. was referred to the Department of Animal Disease, Coastal Plain Experiment Station, Tifton, Ga. by a local veterinarian. The owner reported that for the past three years he had experienced difficulty with swine feeding in a certain pasture on his farm. Many animals had died during this period and diagnosis by a veterinarian in each case was pneumonia.

In the outbreak reported herein, five animals died prior to the visit of the veterinarian. The animals were examined by the veterinarian who diagnosed pneumonia and treated the herd with an antibiotic (Terramycin — Pfizer). Several animals were reported recovered. The veterinarian stated that the hogs shook in the hind quarters, and all exhibited a double respiratory lift. Many developed stiff and swollen legs.

Necropsy revealed firm and swollen lungs. Visceral and parietal pleura were adhered. Caseous abscesses varying in size between 10 and 30 mm. were numerous and were distributed throughout the lung fields. Cervical lymph nodes were swollen and firm. They were not hemorrhagic, however. Grossly, the spleen and liver appeared normal in size and color. No other lesions were observed.

Cultures from the tissues of the hog were obtained by inoculating brain-heart infusion broth (Difco) and agar plates containing 5% defibrinated ox blood.

An organism having the biochemical and tinctorial characteristics of *C. violaceum* was isolated from the lungs, liver, and spleen of the animal.

Organisms in broth produced black to purple pigment and were Gram negative rods measuring 0.5 by 1-2 microns. They were hemolytic on blood agar.

Sugar fermentation reactions gave negative results from adonitol, arabinose, dextrin, dulcitol, galactose, glycerol, inositol, lactose, mannitol, mannose, raffinose, rhamnose, salacin, and sorbitol. Acid but no gas was produced from dextrose, levulose, and sucrose.

Pathogenicity of cultures was demonstrated by intraperitoneal injection of or-

Appreciation is expressed to Mr. Hugh Godwin for help with the bacteriological techniques.

ganisms suspended in broth into cavias and mice and intranasal installation into mice. One ml. was injected intraperitoneally into cavias while one-half ml. was injected by the above route into mice. Six mice were given .3 ml. intranasally.

Mice injected intraperitoneally died during a 12 to 18 hour period. Cavias survived for as long as 96 hours. Mice given broth culture intranasally lived for as long as 96 hours. Three mice recovered. These animals exhibited considerable gross hemorrhage of the lungs while mice injected intraperitoneally did not exhibit gross abnormalities. Caseous lesions observed in the pig liver were not evident grossly in livers of any experimental animal.

Discussion

The purpose in reporting the present outbreak is to once again emphasize the importance of a "non-pathogen" as the causative agent in disease.

Sippel[4] demonstrated that oral administration of a culture of *C. violaceum* to pigs produced temperatures ranging between 104 F. and 105.8 F. Some inoculated pigs died within four or five days or recovered but retained the organism in the tissues. This was demonstrated by sacrifice and culture of the animals. The disease was transmitted by contact of normal pigs with infected pigs.

It was further demonstrated that small doses of the organism can show predilection for lung tissue.

The case reported herein exhibited caseous nodules in the lungs. Such abscesses were scattered throughout the lung fields. Cellular reaction in these areas consisted of many lymphocytes, macrophages, and plasma cells. Well advanced connective tissue replacement was evident in some areas. An atelectasis and emphysema were present.

Lesions in mice and cavias were similar histologically. The lungs did not exhibit lesions like those of the pig. Hemorrhage and atelectasis or emphysema were the essential changes present. The organism could be observed in various areas of the lung sections. The pancreas of several mice revealed caseous lesions. These were similar microscopically to those of the pig liver. Organisms could be demonstrated by use of a Brown and Brenn stain.

Antibiotic sensitivity tests performed on this organism found it to be sensitive to chloramphenicol, Terramycin, Tetracycline, and Aureomycin in concentrations known to be possible in the blood.

No other cases have been reported since this outbreak.

REFERENCES

1. Schattenberg, H. J. and Harris, W. H., *Chromobacterium violaceum Var. Manilae* as a Pathogenic Microorganism. *Jour. Bact.*, 44:509, 1942.

2. Woolley, Paul G., *Bacillus Violaceus Manilae* (A Pathogenic Organism). Bul. John Hopkins Hosp., 16:89-93, 1905.

3. Soule, M. H., A Study of Two Strains of *B. violaceus* Isolated from Human Beings. *Am. Jour. Path.*, 15:592, 1939.

4. Sippel, Wm. L., Medina, G., and Atwood, Max B., Outbreaks of Disease in Animals with *Chromobacterium violaceum*. I. The Disease in Swine. *Jour. Am. Vet. Med., Assn.*, 124:467, 1954.

5. Sneath, P. H. A., Bhagwan Singh, R., Whelan, J. P. F., and Edward, D., Fatal Infection by *Chromobacterium violaceum*.

6. Woolley, Paul G., *Bacillus violaceus Manilae* (A Pathogenic Organism). Bul. Johns Hopkins Hosp., 16:89, 1905.

7. Woolley, Paul G., Philippine Islands Bureau of Government Laboratories Bul. 15, 1904.

8. Soule, M. H., Personal communication (while the author was a student at the University of Michigan).

USE OF CHLORPROMAZINE IN SWINE

Continued from page 572

REFERENCES

1. Williams, R. C. and Young, J. E., Professional and Therapeutic Rationale of Tranquilizers. *Vet. Med.*, 53:127, (Mar.) 1958.

2. Kristjansson, F. K., A Note on the use of Chlorpromazine in the Treatment of Extreme Savageness in Farrowing Sows. *Canad. Jour. Comp. Med. Vet. Sci.*, 21:389, (Nov.) 1957.

3. Ritchie, H. E., Chlorpromazine Sedation in the Pig. *Vet. Rec.*, 69:895, 1957.

Anomaly in the Chicken

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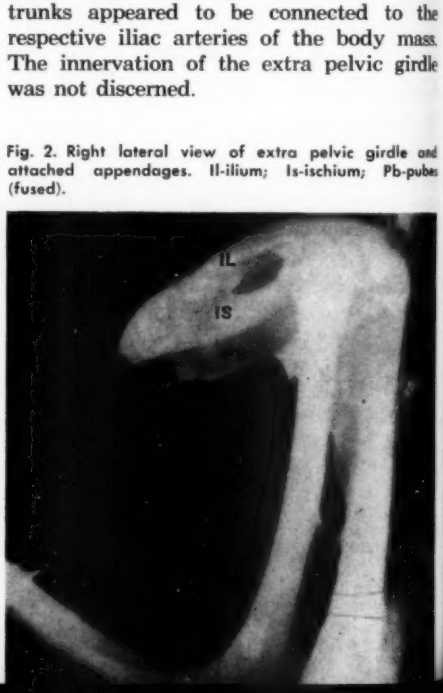
A NEWLY HATCHED CHICK bearing two sets of pelvic appendages was received from Dr. Reece L. Bryant of the Department of Poultry Science. Gross observation revealed that the specimen possessed a second pelvic girdle and attached appendages. The extra appendages were directed in reverse from that of the anterior set of pelvic appendages. The left anterior pelvic appendage showed a marked skeletal alteration; all but the middle tarsus were absent. The bird was able to walk in a limited fashion by means of the anterior set of pelvic appendages. The posterior set did not appear functional. (Fig. 1.)

The skin of the main body mass was continuous with that of the posterior pelvic girdle and attached appendages. The posterior iliac regions of the extra pelvic girdle showed membranous continuations which were embedded in the connective tissues of the main body mass a short distance ventral to the vent. The extra pelvic girdle contained parts of the right and left ilia, the right and left ischia and probably all of the pubes. The anterior ilium on each side was limited to a short, tapered structure the medial margin of which apposed that of the like structure from the other side. Posterior to the acetabulum, the ilia were apposed medially for two thirds of their lengths at which point they tapered laterally and underwent gradual transition from bone to membranous tissue. The ischium on each side appeared incomplete. The cavity between the ischium and posterior ilium on each side appeared to be much larger than that of a normal chick of the same age. (Fig. 2.) A membranous tissue existed from the ventromedial surfaces of the ischia to a short distance anterior to the posterior tip of the ischium on each side. The right and left halves were apposed medially. This structure graduated from opaqueness anteriorly to transparency posteriorly. The structure thus described formed the ventral floor for a closed pelvic girdle. It was assumed that these paired, medially apposed structures were the pubes.

Fig. 1. Dorsal view of skinned chick, showing extra pelvic girdle with attached appendages.

The muscle development of the second pelvic girdle and attached appendages was incomplete. Few distinct muscle masses were identifiable. Extensive fat deposition was found between the muscle and the dermis. The venous trunk was continuous with the posterior vena cava of the main body mass. The right and left arterial trunks appeared to be connected to the respective iliac arteries of the body mass. The innervation of the extra pelvic girdle was not discerned.

Fig. 2. Right lateral view of extra pelvic girdle and attached appendages. Il-ilium; Is-ischium; Pb-pubes (fused).



Published with the approval of the director, North Dakota Agricultural Experiment Station, Fargo, North Dakota.

Although the incidence of leptospirosis in livestock has increased in Missouri in recent years, little clinical human leptospirosis has been reported. In a study which also involved the use of Cox's medium and modified Schuffner's medium in preparation of live antigens for the agglutination-lysis test, 155 serum samples from Missouri veterinarians revealed a reaction in 5.2% of cases.

Leptospiral Antibodies in Missouri Veterinarians

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THE general observations in the United States of increased incidence of leptospirosis in man and animals has been well documented.[1,2]

Three recent surveys of human serum samples revealed that a number of positive leptospiral antibody determinations could be made in a variety of groups being sampled. Cox,[3] in a study of 510 specimens from a random group in South Dakota, found 3.2% with antibody to *Leptospira canicola, L. icterohaemorrhagiae* or *L. pomona*. In a survey of veterinarians in Iowa, a select risk group, Heeren *et. al.* found that 23 of 140 serum samples (16.4%) revealed leptospiral antibodies.[4] More recently a survey of 670 random sample sera in Panama indicated 19.5% with leptospiral antibody titers of 1:100 or higher.[5] This last percentage is high undoubtedly because the areas of greatest incidence of leptospirosis are in subtropical and tropical climates.

It was the aim in this study to compare these figures with those for the state of Missouri which has had little clinical human leptospirosis reported but which experiences an increasing incidence of the disease in livestock each year. Also of interest was the possibility of comparing Cox's medium[6] and modified Schuffner's[7] medium in the preparation of live antigens for the agglutination-lysis test. The ease of preparation of Cox's medium makes it superior in preparation to most other known leptospiral growth media including Fletcher's, Stuart's, and Schuffner's. Cox has reported success with this medium in the preparation of antigenic extracts for the hemolytic test in the serodiagnosis of leptospirosis.[8] This paper reports its comparison with modified Schuffner's medium for producing live antigen in the agglutination-lysis test.

An opportunity to survey Missouri veterinarians for leptospiral antibodies was presented when a large group of them came to the university campus for a meeting.

Materials and Methods

Serum Samples. In cooperation with the Bureau of Laboratories, Missouri Division of Health, blood samples were taken from 155 practicing Missouri veterinarians.

Each blood sample was divided into two

portions in sterile 13 x 100 mm. tubes. One portion was examined by the writers. The other portion was sent to Dr. H. G. Stoenner of the Public Health Service, Rocky Mountain Laboratories, Hamilton, Mont. to test for the presence of antibodies against the Leptospira.

Serological Procedure. By means of his capillary-tube technic with formolized antigens,[9] Doctor Stoenner screened the 155 sera for antibodies against nine serotypes: *L. pomona, L. icterohemorrhagiae, L. canicola, L. hebdomadis, L. grippotyphosa, L. ballum, L. autumnalis, L. pyrogenes, L. sejroe.* Since this technic does not detect antibodies in retrospect quite as long as the agglutination-lysis test, Doctor Stoenner used the latter technic for the determination of titers of sera which were positive by the capillary-tube procedure. Schuffner's modified medium was utilized for the cultivation of all antigens at the Public Health Laboratory.

Serological testing in this laboratory was accomplished exclusively by the agglutination-lysis procedure using live antigens of each of the 17 serotypes listed below: *L. andaman, L. semerang, L. celledoni, L. bataviae* strain Swart van Tienen, *L. pomona* strain S-91, *L. djasiman, L. sentot, L. autumnalis* strain FBF, *L. ballum* strain Garcia, *L. canicola* strain Roesel, *L. icterohemorrhagiae* strain Wijnberg, *L. pyrogenes* strain Salinem, *L. alexi* strain Zurita, *L. grippotyphosa* strain Moscow-V, *L. borincano, L. sejroe* strain Mallersdorf II, and *L. javanica.*

Antigens grown in Cox's medium were visually standardized for density just before their use by diluting dense cultures with phosphate-buffered physiological saline, pH 7.2, and examining drops of diluted cultures at 100 x magnification. Such dilution and examination was continued until all antigens were at the desired density, about 40 organisms per field if examined at 970 x magnification.

Serum samples were serially diluted in phosphate-buffered saline to give stock serum dilutions of 1:20, 1:60, 1:360, and 1:1080. Then 0.2 ml. volumes from each stock dilution were dispensed into four 13 x 100 test tubes for each of the 17 antigens. Equal volumes of the standardized

Fig. 1. A strongly "positive" agglutination reaction revealing the absence of non-agglutinated leptospires, and small agglutinated groups typical of strong reactions.

antigens were then measured into the tubes containing the serum dilutions, therefore giving final serum dilutions of 1:40, 1:120, 1:360, 1:1080. Serum dilutions were performed by the same procedure for positive controls, but known positive serum against *L. icterohemorrhagiae,* prepared in rabbits by the method of Wolf,[7] was substituted for test serum. Negative controls were prepared substituting phosphate-buffered saline for diluted serum. After thorough agitation of the tubes, they were incubated at 29 C. for three hours.

Darkfield examination of drops from the four serum dilutions on clean slides was performed for each antigen, reading for "complete," "partial," "trace," or "absent" agglutination. A "complete" reading indicated 75 to 100% agglutination or absence of organisms as compared to controls; a "partial" reading indicated 50 to 75% agglutination; a "trace" reading indicated 25 to 50% agglutination and was considered significant only in the presence of "complete" or "partial" readings at lower dilutions; an "absent" reading indicated an antigen density and agglutination pattern similar to comparable negative controls.

Titers were expressed as the reciprocal of the highest dilution in which "complete" agglutination was observed.[10]

Since Dr. Stoenner's personal communication showed some serum samples to be

positive at 1:10 dilutions, our samples which had shown one or more "partial" reactions but no "complete" reactions were later tested at 1:10 dilutions.

Results

Table 1 presents a comparative summary of positive agglutination-lysis tests performed at the Rocky Mountain Laboratories and those performed at the University of Missouri. Only serums which were positive in some degree in one or both laboratories are listed in the table; all others were completely negative. Variations between laboratories in titers above 1:10 can probably be partially explained by the difference in the dilution schemes used in the two laboratories.

Typical agglutination patterns were observed with positive serums using the tryptose-phosphate prepared antigens, as seen in fig. 1 through 4. In fig. 1 a strongly "positive" reaction is shown in which almost no free organisms and no large agglutinated masses are present. The small group of cells which appear to be wound together in the center of the field is typical of agglutination in strongly positive reactions. Fig. 2 pictures a "partial" reaction in which there are several loose cells and large agglutinated masses present. Free ends of leptospires are evident around the periphery of the largest mass. A "trace" reaction is seen in fig. 3. Though the number of non-agglutinated organisms appears to be equal to the negative reaction of fig. 4, several small agglutinated groups are present.

It is interesting to note from table 1 that of the 155 human serums surveyed, 145 were negative in all tests. According to combined results of this laboratory and that of the United States Public Health Service, ten serums (6.5%) exhibited some degree of reaction with leptospiral antigens; the results obtained at this laboratory alone

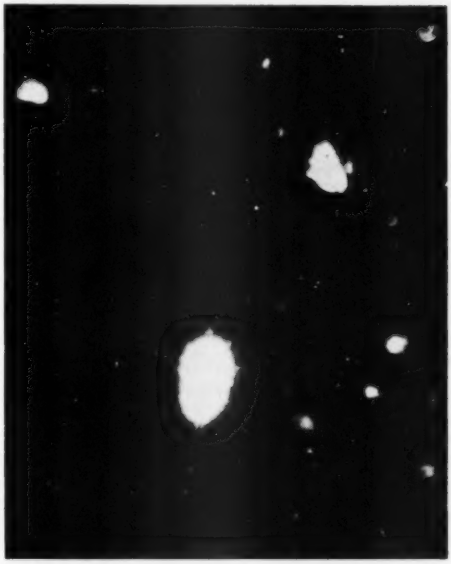


Fig. 2. A "partial" reaction revealing the presence of several large agglutinated groups of leptospires with many non-agglutinated leptospires remaining in the field.

TABLE 1. Comparative Titers of Agglutination-lysis Tests with Schuffner and Tryptose Phosphate (Cox) Grown Antigens

Human Sera	Titers† with Leptospiral Antigens											
	L. pomona		*L. ictero.*		*L. canicola*		*L. grippo.*		*L. semerang*		(others*)	
	Schuf.	Cox	Schuf.	Cox	Schuf.	Cox	Schuf.	Cox	Schuf.	Cox	Schuf.	Cox
145 Sera	0	0	0	0	0	0	0	0	**	0	0	0
1-22	0	0	10	10	0	0	100	120	—	0	0	0
1-32	0	0	10	0	0	0	0	0	—	0	0	0
1-39	10	10	0	0	0	0	0	0	—	0	0	0
1-68	100	120	10	10	10	0	0	0	—	40	0	0
1-79	10	0	0	0	0	0	0	0	—	0	0	0
1-92	0	0	10	10	100	40	0	0	—	0	0	0
1-95	0	0	10	10	10	10	0	0	—	0	0	0
1-96	10	0	10	10	10	10	0	0	—	0	0	0
1-140	10	10	10	10	10	0	0	0	—	0	0	0
1-132	0	10	0	10	100	120	0	0	—	40	0	0
155 Total Sera												

*Five antigens in the USPHS study and 12 antigens in the Missouri University study to which no titers were detected.
**_L. semerang_ was not included in the USPHS study.
†Titers are stated as the reciprocal of the serum dilution.

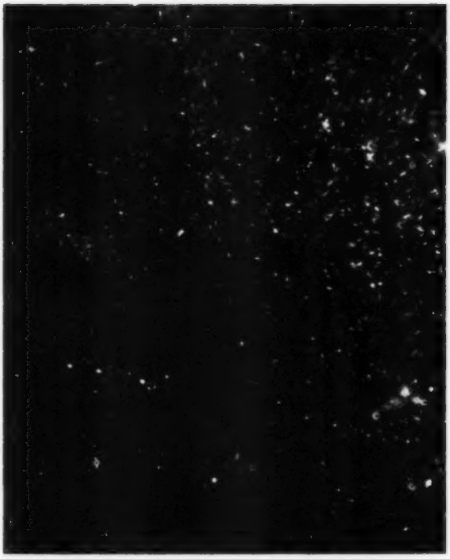


Fig. 3. A "trace" reaction revealing the presence of a few agglutinated groups among large numbers of non-agglutinated leptospires. Note that the total number of non-agglutinated organisms is nearly equal in number to those in the negative reaction.

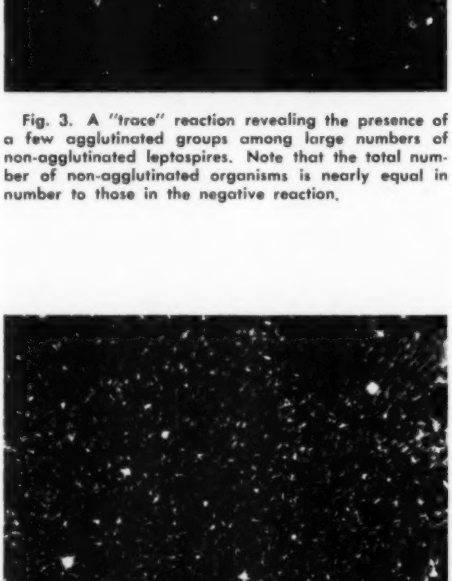


Fig. 4. A "negative" reaction revealing the absence of agglutination among the leptospires.

showed some degree of reaction in 5.2% of the serums.

Further results of this study indicate that 0.2% tryptose phosphate broth is a very favorable medium for the growth of leptospires as antigens. In preliminary experiments which were performed to determine the most satisfactory preparation and growth procedures to use in the production of live antigens, cultures in tryptose phosphate broth plus serum (Cox's medium) were observed to consistently reach heavy densities of growth in five days, whereas cultures in Schuffner's modified medium were much more variable in the density reached in this time.

Discussion

Antigens grown in 0.2% tryptose phosphate broth plus serum are comparable in sensitivity to those prepared in the more complex Schuffner's modified medium. Due to its ease of preparation and standardization, substitution of tryptose medium for Schuffner's medium in the preparation of leptospires for antigens would be greatly beneficial for any laboratory using the agglutination-lysis test, regardless of the laboratory's size or the scope of its operations.

Since few serums were reportedly different in the results of the two studies, favorable correlation suggests the efficacy of tryptose phosphate medium in preparation of antigens, and it also demonstrates usefulness of Doctor Stoenner's capillary tube macroscopic technic for screening large numbers of serums.

The significance of titers in the agglutination-lysis test is somewhat a matter of individual opinion, though titers below 1:100 are not usually considered significant in the diagnosis of leptospirosis. Lower titers, however, are often considered to reflect leptospiral infections in the somewhat distant past. Of course, the possibility exists that such low titers indicate early infections or current infection with some serotypes heterologous to those being employed as antigens, however, these two possibilities are considered to be relatively remote. Titers of 1:10 should be regarded with caution in drawing conclusions of the incidence of residual antibodies to leptospires. Repeated

reaction at low serum dilutions and the occurrence of reactions in other related serotypes aid in drawing conclusions on individual serums.

The Iowa percentage showing 16.4% of Iowa veterinarians with leptospiral antibodies is approximately three time the percentage (5.2%) of Missouri veterinarians with leptospiral antibodies. This may be attributable to the fact that the Iowa veterinarians are more exposed to one of the most common reservoirs of leptospirosis, namely swine. Iowa is first in the nation in swine production, Missouri is third or perhaps fourth.

Summary and Conclusions

Leptospirae grown in 0.2% tryptose phosphate broth plus 10% serum proved to be equally as sensitive in this test as leptospires grown in Schuffner's modified medium.

Seventeen leptospiral serotypes grown in the tryptose phosphate broth and serum were used as the antigen battery in agglutination-lysis tests performed on 155 serum samples from Missouri veterinarians. Results of these tests revealed a high correlation with results of agglutination-lysis tests performed by the United States Public Health Service on the same serums, but whose antigens were prepared in Schuffner's modified medium. Results of this laboratory's study showed some degree of reaction in 5.2% of the 155 serums of Missouri veterinarians.

Acknowledgment

This study was made possible through the cooperation provided by Dr. A. H. Groth, dean, School of Veterinary Medicine, University of Missouri; Dr. E. R. Price, Missouri Division of Health; and Dr. H. G. Stoenner, Public Health Service, Rocky Mountain Laboratories, Hamilton, Mont.

REFERENCES

1. Steele, T. H., Galton, M. M. and Menges, R. W., Leptospirosis as a World Problem. *Vet. Med.*, 52:517, 1957.
2. Yager, R. H., Leptospirosis in the U. S. Today. Med. Sci. Pub. no. 1, 1952, p. 221.
3. Cox, C. D., Human Leptospirosis. *South Dak. Jour. Med. and Pharm.*, 7:329, 1955.
4. Heeren, R. H. *et al.*, *Leptospira pomona* Infections in Man and Animals in Iowa. *Jour. Iowa Med. Soc.*, 44:285, 1954.
5. Calvero, C. M., Reinhard, K. R. and Owen, C. R., Leptospirosis of Man in the Isthmus of Panama. *Am. Jour. Trop. Med. Hyg.*, 6:1054, 1957.
6. Cox, C. D., Hemolysis of Sheep Erythrocytes Sensitized with Leptospiral Extracts. Proc. Soc. Exper. Biol. Med., 90:610, 1955.
7. Wolff, J. W., The Laboratory Diagnosis of Leptospirosis. C. C. Thomas, Springfield, Ill., 1954.
8. Cox, C. D., Alexander, A. D. and Murphy, L. C., Evaluation of the Hemolytic Test in the Sero-diagnosis of Human Leptospirosis. *Jour. Inf. Dis.*, 101:210, 1957.
9. Stoenner, H. G., A Capillary Tube Test for Leptospirosis. *Am. Jour. Hyg.*, 57:316, 1953.
10. Gochenour, W. S., Laboratory Diagnosis of Leptospiral Infections. Bul. N. Y. Acad. of Med., 29:648, 1953.

Liquid Protein Supplements

Use of liquid protein supplements in a ration for fattening cattle has shown promise in experiments conducted at Kansas State College, Manhattan. Cattle on a ration receiving a liquid protein supplement made up of molasses, urea, phosphoric acid and water made better gains than controls in trials. Gains were less on wintering ration, however.

There appeared to be no significant difference in shrink to market, dressing percent, carcass grade, covering of fat, degree of marbling, size of rib eye or degree of firmness. Addition of ethyl alcohol to the ration did not tend to make a difference.

Seaweed Feed Additive

A new feed additive processed from seaweed, *Oscophyllum nodosum*, is said to be a good source of vitamins and minerals. The product is called Algit.

"Fed at the 1-2% level in animal and poultry rations, the new additive has been found to increase gains and production in livestock as well as improving over-all appearance and condition," according to Algit Inc. release.

"Its 26% alginic acid content makes it an effective aid to pelleting, and it can be used as a carrier for synthetic vitamins and feed additives."

Worm Parasites of Cattle in New Mexico

WILLARD W. BECKLUND, M.A.
REX W. ALLEN, M.S.

State College, New Mexico

DESPITE the importance of cattle production to the economy of the southwest, only limited information is now available concerning the worm parasites of cattle in Arizona and New Mexico. Although he did not specifically mention cattle as a host, Price[1] stated that "fasciolid flukes" have been reported from both states; his statement probably refers to *Fasciola hepatica* only, although he discussed the identity of two other "types" of Fasciola that occur in ruminants in this country. Maddy[2] referred to the occurrence of *F. hepatica* in these states, but his information evidently came from Price.[1] Cysticercosis in Arizona cattle was the subject of a report by Sussman and Prchal.[3] Stephanofilarial dermatitis in Arizona cattle was reported by Maddy.[4]

According to the 52nd Annual Report of the Arizona Agricultural Experiment Station,[5] *Ostertagia ostertagi* was incriminated as a cause of losses in feeder calves. This apparently is the only report that mentions a specific roundworm parasite of the gastrointestinal tract of cattle in the area under discussion, although Pistor[6] stated that "stomach and intestinal worms" have been recognized as a major problem in cattle on irrigated pasture and feed lots in Arizona for some time and that these parasites are known to be present in cattle on the open ranges.

The investigation on which this report is based was carried out to provide further information on the identity, geographic distribution, incidence, and prevalence of helminths of cattle in these states.

Acknowledgment

The writers gratefully acknowledge the assistance of Dr. Donald Miller of the Animal Disease Eradication Division, A.R.S., and members of his staff in obtaining information about the origin of some of the Arizona cattle that were examined by us postmortem and also of some that were the subjects of fecal examinations. Dr. C. J. Prchal of the Meat Inspection Division, A.R.S., supplied similar information and kindly made arrangements for facilities for some of the postmortem examinations. Mr. Kay Samson gave technical assistance in the laboratory.

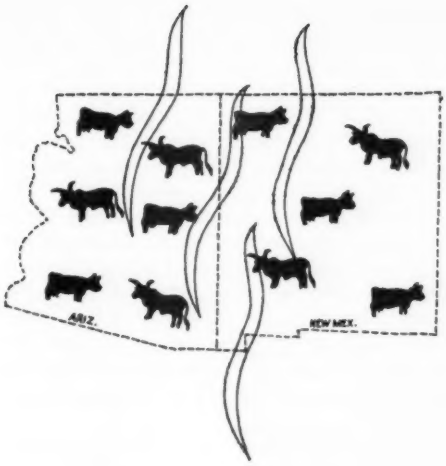
Material and Methods

The organs examined for parasites were obtained from ten cattle that were slaughtered in abattoirs and from an 11th that died of frothy bloat.

The method of examination for recovery of gastrointestinal worms was similar to the procedure used by Porter[7] except that, in order to facilitate the detection and collection of specimens, the amount of fine plant debris in each container of organ contents and washings was further reduced by means

This work was accomplished by the Animal Disease and Parasite Research Division, Agricultural Research Service, USDA at the State College, N. Mex., field station, in cooperation with the New Mexico Agricultural Experiment Station.

and Arizona



of a process of repeated suspension, sedimentation, and decantation prior to the taking of the fractional sample. Loss of worms in the supernatant was minimized by using a 60-mesh screen in the first few decantations and returning the screenings to the original container.

Whenever possible the esophagus, rumen, heart, and lungs were also examined; livers were not generally available, but when they were, only the superficial ducts were examined.

Fecal examinations for nematode eggs were made by Seghetti's method,[4] although slightly modified as to dilution. Examinations for Fasciola eggs were carried out according to the technic of Dennis, Stone, and Swanson.[5] For the detection of lungworm larvae, 5 gm. of feces were "Baermannized" for 18 to 20 hours and the sediment was examined at a minimum magnification of 27.

Results of Postmortem Examinations

Ten esophagi, 11 rumens, five hearts, and ten sets of lungs were completely or partially examined; no parasites were found in these organs. Examination of the contents of the gastrointestinal tracts of 11 cattle, five from Arizona and six from New Mexico, resulted in the recovery of the nine species of parasitic nematodes listed in table 1; the incidence of infection and range in estimated numbers of each species are also given.

Four of the five cattle examined in Arizona harbored nematodes. None were recovered from a 12-year-old cow that had

TABLE 1. Worm Parasites Found in Postmortem Examinations of Five Arizona and Six New Mexico Cattle

Parasite	Arizona			New Mexico		
	No. infected	% positive	Range in estimated no.	No. infected	% positive	Range in estimated no.
Haemonchus placei	4	80	6-34	0	—	—
Trichostrongylus axei	3	60	1-40	0	—	—
Ostertagia ostertagi	4	80	12-120	0	—	—
Cooperia punctata, males	3	60	1-186	3	—	80-462
C. oncophora, males	4	80	20-400	1	17	2
C. pectinata, males	1	20	522	0	—	—
C. mcmasteri, males	1	20	3	0	—	—
Cooperia, males*	1	20	40	0	—	—
Cooperia, females*	4	80	140-1420	3	50	2-793
Nematodirus helvetianus	3	60	8-25	3	50	8-11
Oesophagostomum radiatum	4	80	5-80	3	50	2-42

*See text.

not been on pasture for three years. Each of the infected cattle harbored from six to nine species of worms; the largest total number in any one host was estimated at 2,312. The hosts came from three different localities in the state. The only unusual species found was *Cooperia mcmasteri*; it was recovered from only one animal.

The New Mexico cattle examined were from four different localities. Although all of the six cattle examined were infected, they harbored fewer species and generally fewer worms than the Arizona cattle. The maximum number of species in any individual was two, and the maximum number of worms in any individual was estimated at 1,255.

Table 1 lists 40 of the Cooperia males from the Arizona cattle separately as unidentified specifically. Confusion in the records of identification compels us to so list them without specific identity. We have deliberately listed separately all females of Cooperia simply as such because we believe that a lack of clear-cut distinctions between females of the various species, particularly young adults, makes the attempt to identify them specifically hazardous. This also applies generally to females of Trichostrongylus and Ostertagia, but since males of only one species of each of these genera were found, we have made the normal assumption of conspecificity of the females and males.

Results of Fecal Examinations

Because of the diverse types of environment under which cattle are maintained in Arizona and New Mexico, it appeared logical to consider the results of the fecal examinations in relation to the type of environment grazed by the donor cattle, as shown in table 2. "Dry range" refers to areas of approximately average elevation and rainfall in the two states; "mountain range" means areas of above average elevation and rainfall and for purposes of this report applies wholly to the White Mountain area of west-central Arizona; and "irrigated pasture" refers to artifically watered pastures usually located in valleys and providing lush vegetation and, therefore, grazing for a heavy concentration of animal units.

Examination of fecal samples from 186 cattle from 26 different localities revealed the presence of nematode eggs in 65% of the samples. The average number of eggs per gram of feces in the 120 samples found positive was only 49, and the maximum count was 400 per gram. The results indi-

TABLE 2. Summary of Results of Examination of Fecal Samples from 186 Cattle in Arizona and New Mexico

	Host Environment			
	Dry range	Mountain range	Irrigated pasture	Total or average[3]
Samples examined for nematode and Moniezia eggs				
No. farms sampled	7	9	10	26
No. cattle sampled	65	36	85	186
No. positive for nematode eggs[1]	46	19	55	120
% positive for nematode eggs[1]	71	53	65	65*[2]
Average no. nematode eggs per gram[1]	33	22	73	49*[3]
Maximum no. nematode eggs per gram[1]	128	60	400	196
No. positive for Nematodirus eggs	0	4	4	8
No. positive for Trichuris eggs	0	1	0	1
No. positive for Moniezia eggs	0	0	4	4
Samples examined for Fasciola eggs				
No. farms sampled	3	9	2	14
No. cattle sampled	25	36	7	68
No. positive for Fasciola eggs[4]	0	9	0	9
% positive for Fasciola eggs[4]	0	25	0	13*[2]
Samples examined for lungworm (Dictyocaulus) larvae				
No. farms sampled	4	9	4	17
No. cattle sampled	31	36	13	80
No. positive for Dictyocaulus larvae	0	0	0	0

[1]Measurements of eggs and other characteristics indicated a predominance of Haemonchus and Cooperia.
[2]Based on totals.
[3]Average of all counts.
[4]Probably *Fasciola hepatica*.

cate that a majority of all the cattle in each environment (table 2) harbored nematodes, the incidence of infection being lowest in those on mountain range and highest in those on dry range.

Most of the nematode eggs were not positively identified as to genus because the available criteria for differentiation of the eggs of certain species are not very clear-cut; however, as noted in the table, measurements and other characteristics indicated a predominance of eggs of Haemonchus and Cooperia. There was a very low incidence of Nematodirus and Trichuris eggs and of tapeworm eggs of the genus Moniezia.

Besides examinations for nematode eggs, 68 and 80 samples, respectively, were examined for Fasciola eggs and Dictyocaulus larvae. Only in samples from mountain range cattle were Fasciola eggs found. No Dictyocaulus larvae were found.

Discussion

The known distribution of *C. mcmasteri* in the United States will be discussed elsewhere by the writers, who are, so far as they are aware, the first to report the occurrence of this species in this country. The other species recorded here from New Mexico and Arizona have a wide distribution (see Porter[7] and Dikmans[10]).

Although the percentage incidence of common roundworms in the limited number of cattle examined postmortem by the writers was somewhat comparable to that reported by Porter[7] for cattle in the southeast, intensity of infection was generally much lower. However, some of the cattle examined had never been on pasture; others had been on pasture only briefly or had not grazed recently. Only one of the four that had recently grazed on irrigated pasture was under 14 months of age.

Although fecal examinations revealed that the number of eggs per gram of feces was considerably less on dry range than on irrigated pastures, they also revealed a surprisingly high incidence of worm infection in cattle on dry range. These light infections may be important when the animals are moved from dry range to areas of higher rainfall and lusher grasses for fattening, since lush areas may provide conditions leading to marked increase in worm loads and the possibility of clinical parasitism.

Even the highest egg counts observed — 400 per gram in the feces of cattle on irrigated pasture — were below those considered by Roberts, O'Sullivan, and Riek[11] to be indicative of pathogenic infections; however, egg counts afford at best only a rough index of the degree of infection.

Our finding of a 25% incidence of liver fluke eggs in the feces of the 36 cattle grazing on mountain range was not unexpected, since it is common knowledge that hepatic distomiasis is endemic within the area studied. Above average rainfall and rough terrain provide numerous lakes and poorly drained places suitable for propagation of snails. The only explanation that can be offered for the comparatively low observed incidence of roundworm parasitism in the same area is that all sampling was accomplished in the middle of the winter. Heavy snowfall in the wintertime decreases, if not eliminates, grazing, and thereby reduces the number of worm larvae ingested. It was in this locality and at this time of year that most of the Arizona fecal samples were collected. Examinations made during every grazing season might show an entirely different picture.

Summary

Postmortem examinations for parasitic worms were made on five Arizona and six New Mexico cattle. Nine species of gastrointestinal nematodes, representing six genera, were recovered. The Arizona cattle harbored all nine species, whereas the New Mexico animals harbored only four species representing three genera. Total worm count per individual animal ranged up to 2,312. The species and their percentage incidences were as follows: *Haemonchus placei*, 36; *Ostertagia ostertagi*, 36; *Trichostrongylus axei*, 27; *Cooperia punctata* males, 55; *C. oncophora* males, 45; *C. pectinata* males, 0.9; *C. mcmasteri* males, 0.9; *Cooperia* females, 64; *Nematodirus helvetianus*, 55; and *Oesophagostomum radiatum*, 64.

A total of 186 fecal samples were collected from cattle on dry range, mountain range, or irrigated pasture. All were examined for

nematode eggs; 68, for Fasciola eggs; and 80, for lungworm larvae. Nematode eggs occurred in 65% of the samples, but the egg counts were low, with a maximum of 400 per gram of feces. The most prevalent eggs were tentatively identified as Cooperia and Haemonchus. Fasciola eggs were recovered only in samples from cattle grazed on mountain range. No Dictyocaulus larvae were found.

REFERENCES

1. Price, E. W., The Fluke Situation in American Ruminants. *Jour. Parasitol.*, 39:119, 1953.
2. Maddy, K. T., Hepatic Distomiasis of Sheep and Cattle in the United States. *N. Am. Vet.*, 35:667, 1954.
3. Sussman, O., and Prchal, C. J., *Taenia saginata* in Man and Cattle in Arizona. *Jour. Am. Vet. Med. Assn.*, 116:365, 1950.
4. Maddy, K. T., Stephanofilarial Dermatitis of Cattle. *N. Am. Vet.*, 36:275, 1955.
5. Arizona Agricultural Experiment Station, 52nd Ann. Rpt., 1941.
6. Pistor, W. J., Life Cycle, Control, and Treatment of Internal Parasites of Cattle. *Progressive Agric. in Ariz.*, 7(3): 5, 1955.
7. Porter, D. A., Incidence of Gastrointestinal Nematodes of Cattle in the Southeastern United States. *Am. Jour. Vet. Res.*, 3:304, 1942.
8. Seghetti, L., An Improved Method of Mixing Fecal Suspensions for Nematode Egg Counts. Proc. Helminthol. Soc. Washington, 17:26, 1950.
9. Dennis, W. R., Stone, W. M., and Swanson, L. E., A New Laboratory and Field Diagnostic Test for Fluke Ova in Feces. *Jour. Am. Vet. Med. Assn.*, 124:47, 1954.
10. Dikmans, G., Check List of the Internal and External Animal Parasites of Domestic Animals in North America. *Am. Jour. Vet. Res.*, 6:211, 1945.
11. Roberts, F. H. S., O'Sullivan, P. J., and Riek, R. F., The Significance of Faecal Egg Counts in the Diagnosis of Parasitic Gastroenteritis of Cattle. *Austral. Vet. Jour.*, 27:16, 1951.

Lymphatic Leukemia in a Shetland Foal

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On June 5, the owner of a small group of Shetland ponies called saying one of his foals was down. These animals were all in a pasture which has considerable rough land and a creek.

On arriving at the scene the foal, a two month old filly, was dead.

Three Shetland mares with their colts were in the herd with several Arabian horses. Since the value of these animals was quite high it was necessary to determine whether an infectious disease was the cause of death. The foal was taken back to the veterinary clinic where a more satisfactory necropsy examination could be made.

The history presented indicated that the foal had always been slow and that it did not play. It could not follow the herd up a hill without stopping to rest.

Postmortem Examination

Mucous membranes were noted to be anemic, so much so that the possibility of internal hemorrhage presented itself. Edema was found on incising the skin of the abdominal midline. As the abdominal cavity was opened, a greatly enlarged, somewhat icteric liver came into view and a considerable quantity of sanguinous fluid poured out. The visceral lymph nodes were, in general, enlarged and hemorrhagic, with those of the mesentery particularly large. External lymph nodes were apparently normal in size. Spleen and liver were double to triple normal size. Kidneys were pale and slightly swollen, and an edematous infiltration of the surrounding tissue was present. There was a hypertrophy of the heart with an excess of bloody fluid in the pericardial sac and thoracic cavity.

A diagnosis of lymphatic leukemia was made.

According to Runnells,[1] lymphatic leukemia is very rarely observed in horses; also that it is a disease of old age. Unfortunately specimens were not saved nor were photographs made.

REFERENCE

1. Runnells, R. A., Animal Pathology, 4th ed.

In this case report proteolytic enzymes were administered to bulls suffering from chronic infection of the larynx-pharynx region. Outlined treatment proved effective and allowed some animals to return to service promptly.

Proteolytic Enzyme Therapy in Bovine Practice

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Kennett, Missouri

THE EXISTENCE OF INFECTIONS involving the region of the larynx and pharynx in bulls has been exceedingly troublesome. A thickening of the larynx and pharynx often results from these infections and tissue damage causes difficult respiration. This condition poses a problem, especially in bulls used in service.

In the past, use of cortisone products and sodium iodide has varied with each case of difficult respiration. Although a number of clinical conditions recognized in some animals responded readily to such treatment, results on the whole were not satisfactory. In this report, three clinical cases which did not respond to routine treatment, are discussed. Improvement in the condition of these animals was obtained by therapy with proteolytic enzymes plus human plasminogen (Varizyme — American Cyanamid) and neomycin-polymyxin B (Daribiotic — S. E. Massengill).

In each case signs of difficult respiration had subsided and body temperature as well as white and differential blood counts had returned to normal. Although the animals were confined to stalls, respiration remained extremely difficult. Feed and water intake was normal. Light exercise caused the bulls to become cyanotic, and since recovery was not evident, the animals were considered worthless for breeding service.

Materials and Methods

In each instance a combination of the following was used.

Daribiotic—1 cc. per 100 pounds body weight every 12 hours

Varizyme—

Streptokinase	100,000 units
Streptodornase	25,000 units
Human Plasminogen	

All animals treated were kept under routine observation and given a daily dose of 10,000 units of streptokinase intramuscularly. Treatment was continued for three days.

Case Histories

Case 1. A Hereford bull, three years-of-age, had an acute respiratory infection. Temperature was 105 F. Extreme dyspnea

and cyanosis accompanied by rales from the pharyngeal region and lungs were present. Patient was treated with an antibiotic and cortisone preparation. After acute symptoms subsided the animal was treated twice with sodium iodide. In spite of treatment, chronic symptoms remained. A study of the bacteriology of a culture revealed *Actinomyces necrophorus.*

Case 2. A three-month-old Hereford bull calf with a temperature of 105 F. was treated for calf diphtheria with antibiotics followed by sodium iodide administered intravenously. Within 72 hours, temperature dropped to 101 F., and white blood count was normal. The appetite of the animal improved noticeably, but sodium iodide therapy did not remedy the chronic dyspnea.

Case 3. A Hereford bull, five years-of-age, was treated for a throat and lung infection. Temperature was 106.5 F. Incoordination, dyspnea, moist rales, complete anoxeria and cyanosis were present. After 48 hours of antibiotic therapy, acute symptoms disappeared. Blood and urine determinations returned to normal, but difficulty in breathing was noticed. A culture from the throat was negative. When the animal attempted to walk, the membranes became cyanotic and the patient fell to the ground.

All patients listed in this report exhibited cessation of acute symptoms, yet tissue changes rendered them unfit for breeding service. Although routine therapy was practiced for several months, results were unfavorable. Because of the potential value of the animals the owners asked for further study.

In each of the above cases, after treatment with the proteolytic enzymes plus human plasminogen and neomycin-polymyxin B, the condition of the animal improved so that it was returned to service. In two cases the difficulty in respiration completely disappeared. In the third case the difficulty in respiration continued for three months after the bull was returned to service.

Summary and Conclusion

Proteolytic enzymes, containing streptokinase (100,000 units) and streptodornase (25,000 units) plus human plasminogen and neomycin-polymyxin B administered to bulls suffering from chronic infection of the larynx-pharynx region. Three cases are reported.

This report indicates that the use of intramuscular proteolytic enzymes proved successful in treating animals with dyspnea and cyanosis. The outlined treatment allowed two bulls to return to service and rendered the calf suitable for future service.

Systemic Insect Control

Questions are still coming in about systemic insect control, particularly since the federal Food and Drug Administration has given provisional registration approval to Dow ET-57 (Trolene — Dow Chemical). Most questions are about the best time of the year to administer the agent.

This question can not be answered on a calender basis since cattle grubs appear much earlier in the southern than northern states. Normally the agent should be used from June to October in the South; from September to December in the North. The general consensus is that treatment early in the grub season is indicated, certainly before there is evidence of grubs on the animal's back. In fact treatment when the grubs can be physically demonstrated is not recommended.

Usually the remedy is given in bolus form. Some prefer to use it mixed in water at the rate of 1 oz. for each 600 lb. live weight. Since this is a systemic treatment, dairy animals must not be treated at all because of danger of milk contamination, and beef animals must not be slaughtered for 60 days following administration of the drug. Research is continuing.

Memo From a Country Practitioner . . .

A Half Century of Progress

E. T. BAKER, D.V.M.

Moscow, Idaho

Shortly before his death (see VETERINARY MEDICINE *53:64 [Jan.], 1958) Doctor Baker submitted the following touch of nostalgia with which many in the profession are familiar. The pace of change in both concept and routine of practice inaugurated in that early day continues unabated.*

IT IS INTERESTING to review the progress veterinary medicine has made during the life-span of many of us. The present generation has little knowledge of what "us old timers" were subjected to in the early years of the present century.

When I graduated from the Ohio State University in 1909, about 80% of any practice was equine work. Hog cholera antiserum was just being developed, and the average country practitioner was almost insulted when asked to look at a sick dog or cat.

"Floatin' teeth," and "curin' lameness" were two of the principal bulwarks of our profession. The cities were full of driving, saddle, delivery, and heavy draft horses. The fire departments were horse-equipped, and horse-drawn cabbies launched the legends that modern taxi drivers still uphold.

In rural districts, all farm power and transportation depended on the horse or the mule; every farm or ranch had from two to 60 head. Milk cows, being allowed to live a natural life, were seldom sick.

The Good Old Days

There was a quack at almost every corner, and the way in which qualifications were evaluated was something fearful to behold. Their concoctions "fer man 'er beast" achieved marvelous results by their own admission. These ranged from liniments suitable for everything from Uncle Gus' rheumatiz, to poor Aunt Hettie's ailments, the latter being largely inflammation of the imagination. Gunpowder and lard cured Prince of the bots, and even navicular disease yielded to three applications of Doctor Killem's Favorite Prescription.

When I worked on a newspaper after learning the printing trade, I came across some of the advertisements of the specialists who cured lost manhood, with only an outlay of $40. These venereal specialists used solutions of potassium permangnate by the gallon.

Veterinary Medicine

Before Schmidt a veterinary practitioner of Kolding, Denmark stumbled on his epoch-making discovery of infusion of potassium iodide solutions into the udder, about 97 out of every 100 cows with milk fever died. Survivors were probably borderline cases.

Next, oxygen was used to inflate the udder, and finally common air, such as used by political speakers. After that about 95% were saved.

However, a serious problem presented itself, and that was how to keep the air in the quarters. String was first used, then soft yarn, and finally a soft gauze bandage. The latter reduced the number of injured teat canals down to 50%.

Then an ingenious practitioner reported the use of wax dilators, and that reduced the number of "caked bags" another 10%. In addition to udder inflation, a hypodermic injection of strychnine was given to strengthen the heart. It certainly performed

its work. The first case I was turned loose on happened to be a little Jersey cow in a college herd. After inflation, I gave the animal a quarter grain of strychnine. Some practitioners never gave less than a grain, but I was always conservative.

My patient raised its head a few inches, then shuddered and straightened out. I still think if the heart had not stopped beating, and the cow had not quit breathing, recovery might have been "uneventful," as so many of the case reports say.

Then came the atropine era, followed by lobeline, and sterile camphorated oil. Later, a host of commercial heart stimulants, guaranteed to raise the dead, joined the parade.

After treating about 100 cases, I found that various complications, ranging from traumatic pericarditis to an embolism, often interfered with a rapid recovery. When asked by other colleagues if my recoveries were 100%, I was forced to hang my head in shame and admit a fatality every now and then.

It was much like the westerner who was being examined for life insurance. When the examining physician asked, "What did your father die of?", the answer came in an easy drawl: "Dunno 'zactly, but it wasn't nuthin' serious."

Calcium Era

Just about the time World War I ended, calcium chloride became popular. But practitioners soon learned that a drop of this solution could cause a serious slough in the neck that looked like a third degree burn. It was difficult to explain to the puzzled client, particularly in fly time. When I happened to see one of my patients in this condition with pus running down its legs like a fistula in a horse, I tried to look the other way.

When Greig announced his calcium gluconate solution, I sent to Switzerland for some. In due time half a dozen vials in Jena glass bottles arrived, containing 250 cc. each. The labels claimed that calcium gluconate would not cause an abscess, so that helped.

The first animal I treated failed to respond to 250 cc., but finally got up after injection of the second vial. After that my inflation pumps gathered dust in the attic.

Improvements

At first, only the gluconate solutions were available, but soon commercial houses were putting out 500 cc. bottles of gluconate and dextrose. The results were almost marvelous.

After we experienced a few relapses and deaths, we got to using half hypodermically and the other half intravenously. This reduced the after effects to almost nothing. Everyone was happy. Since I averaged over 140 cases a year, life semed to be one grand song.

But the next summer we began to have a few fatalities. We noticed most of these cases were of the nervous types, and on luxuriant alfalfa pasture. Other practitioners reported the same experience. Ultimately research men suggested a grass tetany or allergic complication. So the manufacturers added phosphorus and magnesium. This reduced these summer cases.

However, there are some cases mixed up with ketosis, grass staggers, and milk fever, cases I call "God knows-but-I-don't," that defy all kinds of treatment, ranging from the regular treatment of chloral and cortisone. These keep one's hatband down to normal size.

Pregnancy disease in ewes, commonly called star gazers by Western sheep men, has gone through much of the same history. After having made over 30,000 professional calls, nothing surprises me anymore, although I sometimes wonder how I have lived so long and learned so little.

Other Notes

It might be pointed out that in spite of the wonderful advances in human medicine, we have yet to hear of an undertaker filing a petition in bankruptcy. Every now and then a patient goes to sleep in a dental chair and forgets to wake up. And in our own profession, pathology laboratories connected with animal clinics report no dearth of autopsy material.

SMALL ANIMAL PRACTICE

How would YOU diagnose this?

CASE NO. 8 Four-year-old female, Collie. Client said, "Does not walk on her left front foot." Muscle atrophy apparent over entire limb. Palpation of left scapulo-humeral joint painful to the animal.

What would be *your* diagnosis — based on the radiograph shown above and findings previously noted? For diagnosis and news of a dramatically effective new treatment regimen, turn to the page indicated below.

turn to page XLVII

Reported cases of North American blastomycosis in the dog are reviewed and two additional reports are presented from Minnesota. Emphasis is placed on the radiological findings and the histopathological examination of the ocular lesions.

Blastomycosis in the Dog

Two Cases With Ocular Manifestations

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THERE are two clinically recognized forms of blastomycosis, local and systemic. Local infections are usually confined to the skin and subcutis, although bone infections and involvement of other tissues and organs may occur. From observations of the disease in man and dog, the local involvements are now believed to be the result of a hematogenous dissemination from a primary pulmonary focus in all cases except those in which a definite innoculation site is known.[1,2] The systemic or generalized form of the disease is a chronic, debilitating, pulmonary condition that may or may not be accompanied by lesions in the skin or other tissues.

Reported cases of North American blastomycosis in the dog were reviewed and chronologically arranged by Ramsey and Carter[3] in 1952, Robbins[2] in 1954, and Newberne, Neal and Heath[4] in 1955. The number of canine cases encountered in the literature is listed by author and geographical location in table 1. Based on a total of 90 case reports at the time of this writing, the disease appears to be most prevalent in the Ohio and Mississippi River basins.

In a collection of 16 case reports of blastomycosis made by Ramsey and Carter,[3] blindness was mentioned as a sign in an Irish Setter (case 15) that exhibited extensive pulmonary nodules and pleuritis on postmortem examination. Exophthalmia and blindness were prominent in two of three dogs described by Robbins.[2] In these instances the eyes bulged as though retrobulbar abscesses were present, and both dogs revealed extensive pulmonary lesions on autopsy. Scleritis, conjunctivitis and purulent ocular discharge have also been observed by Newberne,[4] Lacroix, Riser and Karlson,[5] and Ausherman and Sutton.[6] In human blastomycosis eye involvements are rare. McKee[7] reported an ulcer of the cornea and a leukoma, Churchill and Stober[8] cultured blastomycetes from the vitreous, and Cassady[9] reported primary iridocyclitis in which tubercles were seen in

The authors gratefully acknowledge the photographs prepared by Mr. Lloyd A. Wolf, Medical Photographic Laboratory, Minneapolis, Minn.

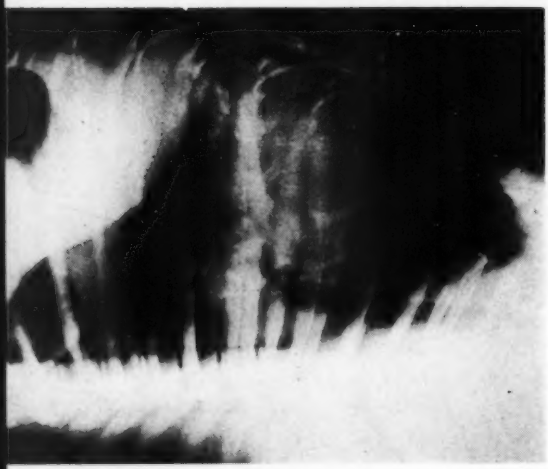


Fig. 1. Case 1. Lateral view of the thorax. Note hilar lymphadenopathy and consolidated areas extending ventro-caudal along the diaphragmatic lobe.

the deep corneal lamellae. In the two case reports from Minnesota that follow, the ocular disorders were the initial sign of disease.

Case Reports

Case 1. In May 1956, a two year old female mongrel, Collie type, was presented to the Veterinary Clinic, College of Veterinary Medicine, University of Minnesota. The owner's main concern was that the dog's right eye had gradually become more prominent during the past few months. Previous treatment by a veterinarian for glaucoma had been unsuccessful. A general physical examination at this time revealed nothing other than an exophthalmia and miosis of the right eye. On ophthalmoscopic examination of the fundus no abnormalities were observed. A boric acid collyrium was prescribed and the animal was discharged.

Three months later the animal was readmitted because of a cough which had been present for one month and was becoming more severe. At this time the animal was thin and had a rough and matted hair coat. Proptosis of the right eye was still evident. It was possible to induce a cough but on percussion and auscultation no abnormalities were discovered. A diagnosis of tracheobronchitis was made and sulfonamides and Carafen* (Fort Dodge) were dispensed for home treatment.

In November, four months after the first examination, the animal was returned to the clinic because of the persistent cough. On several occasions the dog coughed up blood in a frothy mucous. The animal was dehydrated, the hair coat was rough and the skin was dry. Coughing was easily provoked by pressure over the trachea, and proptosis of the right eye was still prominent. The animal was hospitalized for three days. At no time during clinic visits or hospitalization was the temperature found to be abnormal. Results of laboratory and radiologic examinations were as follows:

Hemogram:	
Hemoglobin	12.9
WBC	17,700
Hematocrit	40
Sed. Rate/30 min.	19
/60 min.	42
Differential	
Eosinophils	6
Stabs	8

Fig. 2. Case 1. Ventro-dorsal projection of the thorax. The consolidated areas are limited to the right lung and are seen between the 7th, 8th and 9th ribs.

*Carafen contains caramiphen ethanedisulfonate and ammonium chloride.

Segmenters 80
Lymphocytes 6
Fecal analysis: Taenia sp.
Microfilaria: Negative
Skin tests (tuberculin and histoplasmin): Negative
Bacteriologic culture of the sputum: Nonhemolytic staphlococcus, streptococcus and *Bacillus subtilis.*

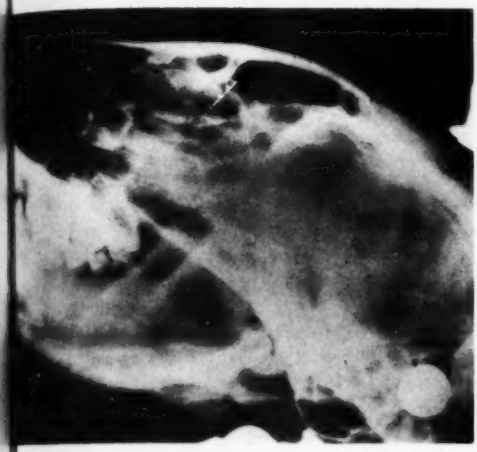


Fig. 3. Case 1. Lateral view of the head. Fleshy mass found on necropsy is seen as an irregular area of increased density in the frontal sinus area. Several calcified bodies arranged in linear fashion appear to be lying within the mass.

Roentgenologic study: The lateral and ventro-dorsal radiographs of the thorax reveal a large mass at the bifurcation of the trachea and an area of diffuse solidification extending ventro-caudad along the anterior border of the right diaphragmatic lobe of the lung (fig. 1,2). The larynx and trachea appear normal. An increase in density is noted in and about the right frontal sinus and several irregular calcified bodies are present in this area (fig. 3,4). There appears to be some destruction of the ethmo-turbinates and cribriform plate.

Conclusions: These findings are interpreted as a possible malignant neoplasm with the primary site in the area of the right frontal sinus and metastatic lesions in the lungs.

The owner requested euthanasia, and permission was given for necropsy.

Necropsy findings: A white fleshy mass, 3 cm. in diameter, was located at the junction of the right frontal, parietal and sphenoid bones posterior to the right eye. The mass had penetrated the bone to the dura mater but had not disturbed the dura. The cribriform plate and the turbinate bones were intact. Another mass, 4 x 5 cm., was located at the bifurcation of the trachea. This mass had penetrated the trachea and was producing a partial obstruction. The right diaphragmatic lobe of the lung was edematous with atelectatic portions noted on the periphery.

Histopathology. The cellular exudate of the mass posterior to the eye and the mass at the bifurcation of the trachea was composed of epithelioid cells, a few plasma cells, neutrophiles and an occasional blastomyces organism. Several sections of the lung through the consolidated areas exhibited the same type of exudate with a

TABLE 1. Geographical Distribution of Reported Cases of North American Blastomycosis in the Dog

	Tabulations by Authors										
	Ramsey & Carter	Menges	Robbins	Newberne	Austherman	Witter	Riser	Robinson	Kelser	Wolf	Total
Alabama				2 -							2 -
Illinois	6 -					1 -	2 -				9 -
Iowa	3 -										3 -
Kentucky		7 -	1 -		55 -						63 -
Louisiana				1 -							1 -
Minnesota										2 -	2 -
Mississippi				1 -							1 -
North Carolina	1 -										1 -
Ohio	1 -		1 -								2 -
Tennessee								1 -			1 -
Washington D. C.									1 -		1 -
Unknown	5 -		1 -								6 -

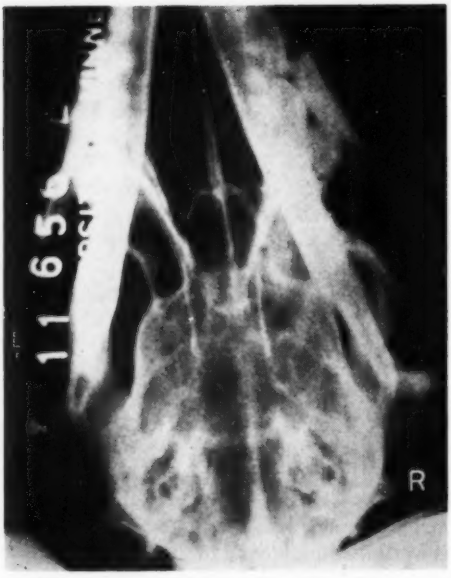


Fig. 4. Case 1. Dorso-ventral projection of the head. Note asymmetrical density obliterating the frontal sinus area on the right side.

few organisms present. The bronchi were free of exudate.

Case Report

Case 2.† On Dec. 31, 1955, a five year old female German Shepherd was referred to a practicing veterinarian in southern Minnesota because of blindness that had been noticed for one week. The animal was purchased in Minneapolis and had never been far from its home in southern Minnesota. The animal was examined and no signs of systemic illness other than a temperature of 103 F. were noted. On ophthalmoscopic examination a posterior senechia with complete adhesions producing iris bombé was present in both eyes. The tonometer readings at this time were 35. Atropine, epinephrine, and neosynephrine were unsuccessful in breaking the adhesions. The dog was then placed on acetazolamide (Diamox — Lederle), 250 mg. twice daily.

On Jan. 2, 1956, the tonometer readings had fallen to 15 but again increased two days later. Surgery was decided upon at this time. Transfixation was the procedure used. Four punctures in the iris were made with one insertion of the Graefe knife. This was performed on each eye. Penicillin and streptomycin were administered daily.

Eleven days following surgery, the corneas were beginning to clear but the general appearance of the dog was poor. An agglutination-lysis test was negative for leptospirosis. The temperature remained at 103 F. and a nasal discharge resembling that of distemper was present. Abscesses were found at the base of each claw. The antibiotics were replaced by Aricyl* (Winthrop).

Because of the dog's failing condition, permission was granted for euthanasia and necropsy two weeks following surgery.

A complete necropsy report is not available on this animal, however a portion of the lungs and the globes of the eyes were submitted in formalin to the College of Veterinary Medicine, University of Minnesota, for histopathologic examination.

Histopathology. The lung tissue showed a patchy consolidation composed mainly of macrophages, a few neutrophiles, lymphocytes and an occasional blastomycete. The infection was not walled off with connective tissue.

The lesions in the eyes consisted grossly of opacity of the corneas. The globes of both eyes contained a thick white exudate. Microscopically the anterior chambers contained exudate with a few mononuclear cells scattered throughout. The iris was distorted and congested. The lens was opaque and cataractous. The exudate in the posterior chambers contained plasma cells, pigment laden macrophages and lymphocytes. The retinas were both detached and the normal architecture was completely destroyed. The remains of the retinas were infiltrated with plasma cells, lymphocytes and neutrophiles. Foci containing numerous blastomycetes were located near the optic papilla in the retina and in the sclera near the optic nerve (figs. 5,6).**

†Obtained through the courtesy of J. M. Higbee, D.V.M., Albert Lea, Minn.

*Aricyl contains disodium salt of acetarsonic acid.

**The authors gratefully acknowledge the detailed pathologic report of the eyes submitted by Dr. R. H. Monahan, Assistant Professor of Ophthalmology Medical School, University of Minnesota. A condensed report was prepared for this writing.

Fig. 5. Case 2. Photomicrograph of a section through the eye (x 27). (1). Lesion in the sclera. (2). Optic nerve. (3). Vitreous.

Discussion

In both case reports the clinical onset of the disease was not typical of a mycotic involvement, and blastomycosis was not suspected until the tissues were examined histologically. The initial ocular disorders were a primary clinical manifestation of the disease. In case 1 protrusion of the right eye was caused by the retrobulbar mass. The globe, itself, showed no abnormalities on ophthalmoscopic or gross pathologic examination. The respiratory involvement in this animal became apparent two to three months following the primary eye complaint. The dog gradually lost weight and became dehydrated as the coughing persisted. The course of blastomycosis from the first indication of illness to termination is reported as several weeks in the dog,[2,3] but in this instance it was more than four months. Gross necropsy findings in case 1 also coincided with the roentgenologic interpretation of a malignant neoplasm. It was only after careful examination of the tissues that a few blastomyces were discovered.

In case 2 blindness was the result of extensive intraocular damage. Blastomyces were numerous in the retinal and scleral lesions. The slight elevation in temperature was the only indication of a systemic illness until the distemper-like signs developed about two weeks after the initial examination. The yeast-like organisms were again difficult to find in the lung tissue and serial sections were necessary for their demonstration. Digital abscesses may have been a cutaneous manifestation of the disease, but unfortunately culture material and biopsy specimens were not obtained.

From the symptoms and course of the disease, it would be reasonable to assume that the primary site of infection was in the area of the frontal sinus in case 1 and the eyes in case 2 with later dissemination to the lungs. The reverse, however, is a possibility as well and the lungs may have concealed the initial foci.

Radiographs of the thorax have been helpful in the diagnosis of canine blastomycosis. The dense mass at the bifurcation of the trachea, representing bronchial lymphadenopathy, has been one of the most consistant radiologic findings.[6,10,11] Local and diffuse pulmonary consolidations may or may not accompany the hilar enlargement. It must be remembered that the radiograph is not specific for blastomycosis. Other studies such as serological tests, skin tests, culture and biopsy must be utilized for differentiation from other granulomatous diseases, pneumonia, neoplasms and parasitic infections.

Summary

The reported cases of North American blastomycosis in the dog are reviewed and two additional reports are presented from

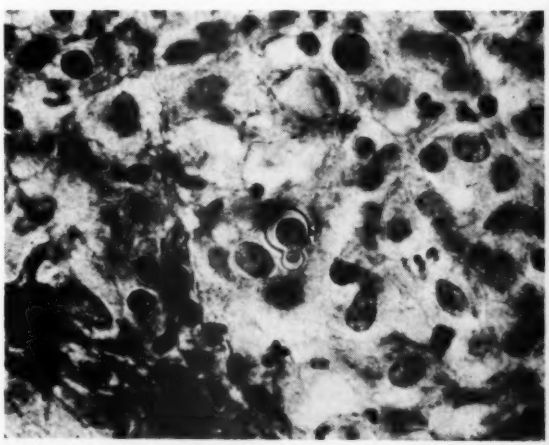


Fig. 6. A budding *Blastomyces dermatitidis* found in the scleral lesion, [Fig. 5 (x 1200)].

Minnesota. Emphasis is placed on the radiologic findings and the histopathologic examination of the ocular lesions.

REFERENCES

1. Schwarz, J., and Baum, G. L., Blastomycosis. *Am. Jour. Clin. Path.*, 21:999, 1951.
2. Robbins, E. S., North American Blastomycosis in the Dog. *Jour. Am. Vet. Med. Assn.*, 125:391, 1954.
3. Ramsey, F. K., and Carter, G. R., Canine Blastomycosis in the United States. *Jour. Am. Vet. Med. Assn.*, 120:93, 1952.
4. Newberne, James W., Neal, James E., and Heath, M. K., Some Clinical and Microbiological Observations on Four Cases of Canine Blastomycosis. *Jour. Am. Vet. Med. Assn.*, 127:220, 1955.
5. LaCroix, L. J., Riser, W. H., and Karlson, A. G., Blastomycosis in the Dog: A Case Report. *N. Am. Vet.* 28:603, 1947.
6. Ausherman, R. J. and Sutton, H. H., Clinical Signs of Blastomycosis in Dogs. *Jour. Am. Vet. Med. Assn.*, 130:541, 1957.
7. McKee, S. H., Blastomycosis of the Cornea. *Internat. Clinics*, 3:50, 1926.
8. Churchill, T., and Stober, A. M., One Case of Blastomycosis. *Arch. Int. Med.*, 13:568, 1914.
9. Cassady, J. V., Uveal Blastomycosis. *Arch. Ophth.*, 35:84, 1946.
10. Menges, Robert W., McClellan, James T., and Ausherman, Robert J., Canine Histoplasmosis and Blastomycosis in Lexington, Kentucky. *Jour. Am. Vet. Med. Assn.*, 124:202, 1954.
11. Witter, Ralph E., Schiller, Alfred G., Morrill, C. C. and Maksic, D. D., What is Your Diagnosis. *Jour. Am. Vet. Med. Assn.*, 126:51, 1955.
12. Riser, W. H., Canine Medicine. American Veterinary Publications, Inc., Evanston, Ill., 1953, p. 440.
13. Robinson, V. B., and Schell, F. G., Blastomycosis in the Dog — A Case Report. *N. Am. Vet.*, 32:555, 1951.
14. Kelser, R. A., Personal Communications to Robinson. Cited by V. B. Robinson, *op. cit.*

Venom Poisoning

In the *Journal of Medical Sciences* (August 1958) Deichmann, *et.al.* presented a report on rattlesnake venom poisoning. Amongst other animals, dogs were given intramuscular injections of a crystallized venom with 75% of the moisture removed. The average bite of the rattlesnake releases 650 mg. of venom, and this is said to be sufficient to kill four young pigs or 12 small dogs.

The crystalline venom diluted with 75% saline was administered intramuscularly to dogs. The average toxicity of this solution for dogs is 0.64 mg./kg. This dosage produced the usual toxic symptoms of edema at the site of injections, local necrosis, general lethargy, salivation and bloody diarrhea, and in untreated cases death in coma resulted. If immediately after the administration of the venom the animal was given hydrocortisone in an initial dose (intramuscularly 100 mg.) the dog recovered. If treatment was delayed two to four hours the number of recoveries varied to from 65 to 75%. Each dog received subsequently 50 mg. of hydrocortisone (Hydro-Cortef) once a day for several days. The cortisone did not visably influence local proteolytic or septic effects, or the healing. — *R. R. Dykstra, D.V.M.*

Chlorinated Hydrocarbon Poisoning

Chronic poisoning by a number of the large group of chemicals classed as chlorinated hydrocarbons often offer confusing diagnostic situations. These new complex agricultural compounds, unknown a few years ago, are in common use on farms and ranches throughout the country.

Diagnosis of chronic poisoning by chlorinated hydrocarbons should be made only after thorough study of history, symptoms, length of exposure, and lesions. These recommendations have been emphasized after experience at Kerrville, Tex. that a third of test autopsies failed to reflect chronic poisoning, even after toxic symptoms were severe.

Analysis of stomach contents for poisonous elements has proved more dependable than tissue analysis in these cases. In cases involving animals that have been sprayed for flies or other external insects, analysis of hair for deposit of toxins is recommended. Animals may have accommodated themselves to chronic toxicity of chlorinated hydrocarbons and symptoms of rabies, pseudorabies, encephalitis, and salt poisoning may be mistaken as manifestations of poisoning.

Neraval is classed as a thiobarbituric acid and has as a primary advantage short duration of action. Clinical evidence indicates that the drug is a versatile intravenous general anesthetic for dogs and cats.

An Ultra Short-Acting Anesthetic

LEO L. LIEBERMAN, D.V.M.

Waterford, Connecticut

METHITURAL sodium (Neraval—Schering) is an outstanding ultra short-acting general anesthetic for intravenous administration. Its action is characterized by extremely rapid removal from the blood and an accelerated rate of degradation and detoxification of the thiobarbiturate molecule in comparison with thiopental sodium.

Among thiobarbiturates, rate of removal from the blood governs duration of action.[1] Within 20 minutes after intravenous injection of an anesthetic dose of Neraval, more than 50% will have disappeared from the blood stream.[2] Some is degraded by the liver but fat depots (such as omental fat) will absorb most of the dose within 30 minutes. After 24 hours, only some 30% of the dose will be found in the entire carcass. This compares favorably with the 90% thiopental sodium that remains in the carcass after 24 hours.[2]

This diminished tendency to accumulate in body tissues serves to prevent prolonged depression frequently seen following use of other compounds of this group. Its analgesic effect outlasts anesthesia and prolongs muscular relaxation, permitting completion of short surgical procedures even though central nervous system depression begins to rise above surgical anesthesia. This is particularly desirable in the pediatric and geriatric patient.

Apnea is rarely observed and the lack of respiratory depression offers a desirable advantage over other thiobarbiturates. The early loss of reflexes reduces struggling during induction. Rapid loss of the pedal reflex has led us to use the pupillary reflex as an index of depth of anesthesia.

Prolonged analgesia is evident in many procedures. We have seen a patient lift its head and watch the last suture being placed without making a struggle. This may also account for the absence of running movements or turbulence of patients during recovery from anesthesia.

Neraval is prepared for use by adding 20 cc. of sterile distilled water to 1 gm. of the powder to make a 5% solution. For radiographic positioning or other short procedures in dogs, 1 cc. per four pounds body weight is adequate. Rapid intravenous injection is mandatory with this drug. Nera-

val is less toxic, lower in relative anesthetic potency and more rapidly removed from the circulation than are other short-acting barbiturates. These properties require that injection rate be rapid to insure smooth induction of anesthesia.

Administration

When preanesthetic sedation such as Demerol (Winthrop) or morphine sulfate-atropine is used, the anesthetic dose is calculated at 1 cc. per five pounds body weight. At this dose, deep anesthesia will last from 15 to 20 minutes. For longer procedures, a syringe of methitural sodium solution may be taped to the leg and additional dosage administered as needed. The addition of 25% to 30% pentobarbital sodium solution (1 grain per cc. of solution) to the 5% methitural sodium solution has satisfactorily prolonged deep anesthesia from 20 to 35 minutes.

For cats, Neraval is diluted to a 2½% solution; for kittens, a 1¼% solution is used to increase the margin of safety. German veterinarians report routine use of 75 mgm. per kg. (35 mg./lb.) Neraval intraperitoneally for spaying and castrating cats.[3,4] In this practice, irregular response to intraperitoneal injection has created a preference for the intravenous route.

Case Report No. 1. A three-year-old male crossbred Boxer, weighing 38 lb., was presented with an abscessed anal gland. Neraval (12 cc. of 5% solution) was administered intravenously. Excellent anesthesia lasted for 20 minutes. The dog ate its regular meal 1½ hours after anesthesia.

Case Report No. 2. A six-month-old mixed breed female dog, weighing 25 lb., was presented to be spayed. Morphine sulfate and atropine sulfate (½ grain and 1/150 grain respectively) were administered 30 minutes before anesthesia. Neraval (7 cc. of 5% solution intravenously) produced excellent anesthesia. There was no struggling during surgery. The animal was awakening one hour after surgery was completed.

Case Report No. 3. A one-year-old ten pound male cat was presented for castration. Neraval (6 cc. of 2½% solution) was administered intravenously. This dose produced excellent relaxation for surgery. The cat was completely awake and ready to be sent home within 1½ hours.

Case Report No. 4. A two-year-old male cat, weighing 14 lb., was presented to have teeth cleaned and one tooth extracted. This animal was strong and difficult to handle. Neraval (4 cc. of 5% solution) was administered intraperitoneally for complete anesthesia. The animal was awake and ready to be sent home in two hours.

Case Report No. 5. A six-month-old female Collie, weighing 35 lb., was presented to be spayed. Preanesthetic medication consisted of ½ grain morphine sulfate and 1/150 grain of atropine. Neraval (6 cc. of 5% solution) plus 2 cc. pentobarbital sodium solution were administered intravenously. There was excellent anesthesia for 35 minutes. The animal awakened smoothly.

Case Report No. 6. A three-year-old male Cocker Spaniel, weighing 40 lb. was presented to have treatment for severe otitis. Preanesthetic medication was 1 cc. Demerol and 1/150 grain atropine. Neraval (9 cc. of 5% solution) with 1 cc. of pentobarbital sodium solution was administered intravenously. There was excellent anesthesia for 30 minutes. The dog was awake in one hour and sent home in three hours.

Case Report No. 7. A one-year-old female mixed breed cat was presented to be spayed. No preanesthetic medication was administered. Neraval (6 cc. of 2½% solution) plus 1 cc. pentobarbital sodium solution was administered intravenously. Excellent anesthesia was maintained during preparation and surgery. The cat was awakening 15 minutes after completion of surgery.

Summary

Clinical experience and impressions concerning this new ultra short-acting thiobarbiturate for intravenous general anesthesia in dogs and cats are presented. Representative case histories are cited to illustrate safety and versatility of the drug in clinical practice. Methitural sodium is compatible with the usual preanesthetic medications. Depth and duration of anesthesia may be reduced by decreasing dosage of the drug. Anesthesia may be safely prolonged by (a)

supplemental injections of Neraval or, (b) addition of standard solutions of pentobarbital sodium (1 gr. per cc.) to the Neraval solution. Finally, by reason of its prompt removal from the blood and diminished tendency to accumulate in body tissues, rate of administration must be more rapid than is customary with other barbiturates.

REFERENCES

1. Brodie, B. B., Bernstein, E., and Mark, L. C., *Jour. Pharm. and Experimental Therapeutic*, 105:421, 1952.

2. Blake, M. W. and Perlman, P. L., *Jour. of Pharm. and Experimental Therapeutics*, 117:287, 1956.

3. Ullrich, K., *Tieraerztliche Umschau*, 1954, 9, 19/20, p. 348.

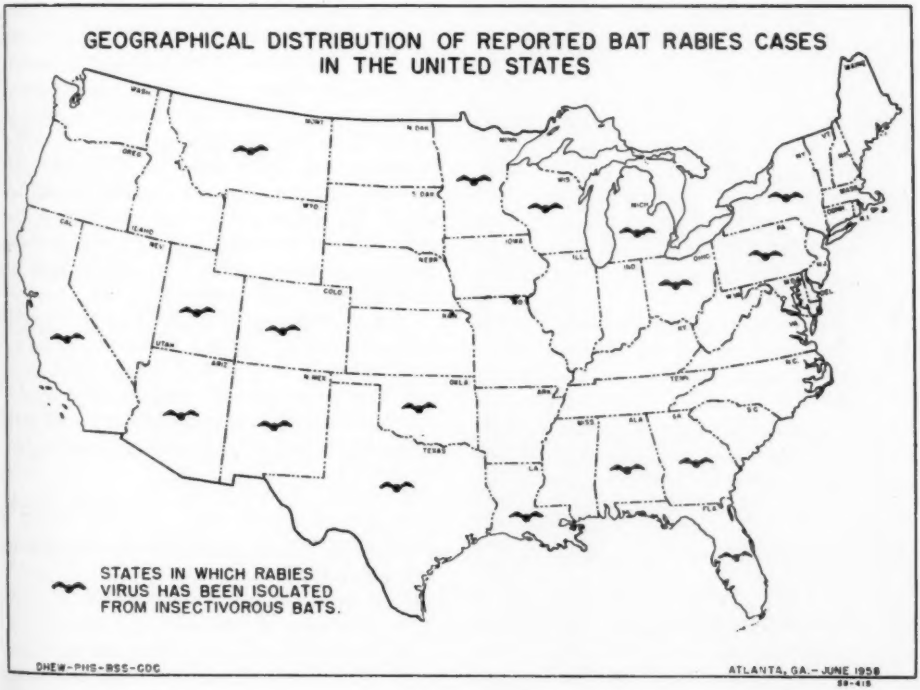
4. Tolle, A., Berliner and Munchener Tieraztliche Wochenschrift, 1955, no. 2, p. 24.

New Cases of Bat Rabies Reported

Two new cases of bat rabies were recognized in California during the summer months.

One came to the attention of public health officials in Thermalito, where two dogs were observed playing with a bat. Microscopic examination of the bat brain revealed no inclusion bodies. Mouse inoculation test, however, was positive for rabies nine days later. The bat was probably a hoary bat, *Lasiurus cinereus*, although positive identification was not available because the bat carcass was destroyed.

The second rabid bat was found lying in the street of Berkeley. During the course of play, two young boys were either bitten or scratched. As in the first case, microscopic examination was negative for inclusion bodies. Mouse inoculation test was reported positive for rabies seven days later. The bat in this instance was identified as a Mexican freetail, *Tadarida mexicana*.


GEOGRAPHICAL DISTRIBUTION OF REPORTED BAT RABIES CASES IN THE UNITED STATES
STATES IN WHICH RABIES VIRUS HAS BEEN ISOLATED FROM INSECTIVOROUS BATS.
DHEW-PHS-BSS-CDC
ATLANTA, GA.-JUNE 1958

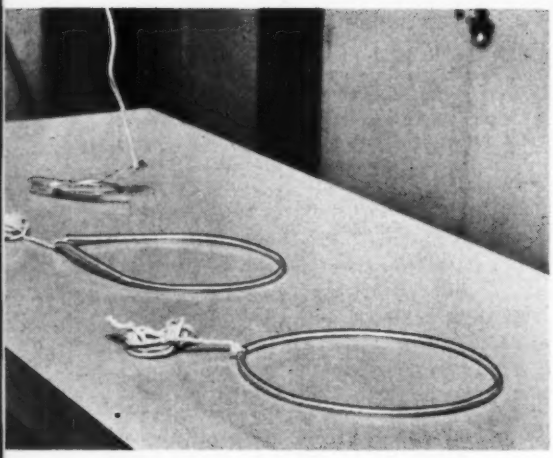


Figure 1.

Restraint of Small Animals

JACK O. KNOWLES, D.V.M.

Miami, Florida

BECAUSE OF ITS INTIMATE ASSOCIATION with man, the small animal patient normally submits to restraint quite readily. Although it is necessary for the practitioner to gain the patient's confidence, physical restraint is an integral part of small animal practice, and for this reason it is imperative that technics be not only effective, but acceptable to the owner of the animal patient as well.

We have tried many restraining devices in the past, running the gamut of stocks, straps, clamps and the like. Many will work, none better than the restraining device pictured on these pages, most not as well. Any practitioner knows that an owner must never see a patient restrained by anything that looks severe or could be construed to appear cruel.

It is not always desirable to keep clients in the waiting room or the doctor's office while an animal patient is undergoing examination or treatment. Since stocks and some other restraining devices must be hidden from clients, it is less than satisfactory to have such equipment on the premises at all.

The Restraining Device

Figures 1 and 2 illustrate the restraining device now in use at our clinic. It consists of two lengths of butcher's cord, each about 3 ft. long. One end of the cord is threaded through approximately 18 inches of small plastic conduit and tied to make a non-constricting ring. Figures 3 and 4 illustrate an animal under restraint.

The animal (fig. 3) is placed in lateral recumbency on a table. Dorsal hind leg is passed through the loop and the free end of the loop is passed over the dog's back down the left side of the table, and is cleated to make it secure. The front leg is passed through the other loop. The free end is passed over the shoulder and cleated to the table on the same side as previously described. All four legs are extended, individually tied by a thong and cleated to the right side of the table. In this manner the patient is restrained by lying on its side on a table with legs extended.

The head is generally left free. It too can be restrained by tying a thong to the collar and securing this to the table. The head can be more completely restrained by applying a standard muzzle to the dog and then tying the nose of the muzzle to the table.

Advantages

There are five particular advantages to this equipment:

1. It is simple and inexpensive.
2. It is easy to use and disinfect.
3. It is comfortable for the patient.
4. It is of a nature that does not inter-

fere with other work such as injections or minor operations.

5. It does not look like severe forced restraint.

It might be noted that the cord should either be thick, such as sash cord to avoid cutting, or it should be covered with something such as illustrated here to preclude any possibility of cutting or chafing.

It is not necessary that an animal be snubbed tight in a rigid, uncomfortable manner. Rather, it should be used in such a way as to be effective, but not to cause stress, and to stimulate active resistance of the patient.

Properly used in every day practice, this restraining device is almost like having an extra hospital attendant on the payroll.

Figure 2.

Figure 3.

Figure 4.

FIGURE 1.

The restraining device consists of two lengths of cord, each about 3 ft. long.

FIGURE 2.

Cords are threaded through plastic conduit.

FIGURE 3.

Animal in lateral recumbency on a table. Note dorsal hind leg passed through loop and the free end of loop passed over the dog is back down the left side and cleated to make it secure.

FIGURE 4.

Restraint is complete. Animal is comfortable, albeit secure.

During recent years a number of veterinarians have purchased dental equipment to effect improvement in dental care. The writers report on the practical aspects of dental work in a typical clinic. Shown here (left) are equipment, instruments, glass cup with course pumice, brushes, polishing cup and prophylactic paste.

Improvement in Dental Care

E. E. CHAMBERS, D.V.M., FRANK K. LOVE, D.V.M. and TERRY B. GRAY, C.D.A.

Rossville, Georgia

DURING ONE OF HIS LECTURES in anatomy, Doctor McLowd made the statement that a horse is only as good as its feet and/or teeth. This statement has proved itself through the years and pertains not only to horses but to other species as well.

In our small animal practice, I can not say that we have made many great strides in improving on the care of feet, but we certainly have made great progress in improving the care of teeth. Years ago, our procedure was to scrape tartar, extract teeth, paint the gums with Di-O-Chrome (Warren-Teed) or a similar preparation and hope the client was satisfied. We would sometimes anesthetize, scrape, then brush the teeth with a toothbrush, many times instructing the owner to brush the patient's teeth as well if possible. This latter method had some advantage over hit and miss prophylaxis, but results were not good. In a short time tartar began forming again; and many times halitosis was still present.

Several months ago we purchased used dental equipment (powered) with attachments. This apparatus is used mainly in dental laboratories and can be purchased from any dental supply company. We also bought some extra scrapers, picks, brushes, elevators, prophylactic paste, pumice, and rubber polishing brushes.

Treatment Procedure

With this new equipment we have revised our treatment procedure and have been more than satisfied with results in the majority of dental cases. Owners are pleased with our technics, since the patient's teeth emerge from treatment as clean as those of a human being after a dental visit. Some dogs have badly stained teeth, and in such cases results are not outstanding; but the difference in "before" and "after," and the time elapsing before new tartar forms and halitosis returns, is enough to warrant calling the results good.

The dog with a so called distemper mouth, or one that went through a stage of malnutrition during puppyhood and ended up with soft, mealy teeth, or extra hard teeth with pitted or eroded areas on the

enamel will not respond to dental care as well as the dog with more or less normal, healthy tooth enamel.

Animals that are losing weight or exhibiting loss of appetite and energy, and have a disagreeable oral odor with diseased teeth, and are beginning to go into that phase of life often diagnosed as old age accompanied with kidney embarrassment — these are the ones that need dental treatment. If possible, they are given one or two daily injections of Meticillin (Schering) prior to surgery and are anesthetized with attention to the ordinary precautions needed in old toxic animals. Many dogs of this type receive Meticillin a day or two following surgery. K/D (Hill Packing) or a similar diet is often recommended.

Geriatric capsules should be dispensed a week or ten days before some dental appointment. At the present time, we recommend Senazol Capsules (Tablerock Laboratories) which contain ethinyl estradiol, .01 mg.; methyl testosterone, 2.5 mg., metrazol, 100 mg.; plus vitamins and minerals. We believe the daily dose of metrazol in the capsule helps to better prepare our patients for surgery.

Cleaning Teeth

The technic of cleaning teeth is simple but time consuming. The anesthetized animal should be placed on a slightly inclined table so that the head is lower than the body. A mouth gag is necessary to keep the dog's mouth open. Teeth are scraped clean of all tartar. A pick-like scaler is used to clean between the teeth and slightly under and near the gum line.

While the dog is on its left side, it is possible to scale the lateral side of the right teeth and the medial side of the left teeth, both upper and lower. By turning the dog, front teeth, both anterior and posterior surfaces, can be scaled. By turning the dog on the other side the scaling process can be completed.

After tartar is removed, teeth should be painted with tincture of iodine since it helps remove stain; next each tooth is brushed on all surfaces with a wet brush dipped in coarse pumice. During this process, two or three types of brushes should

Fig. 2. Tooth being scaled. Note rubber polishing cup in hand piece.

be used so that all enamel surfaces can be covered. The process should then be repeated using the brushes and some Oralust Prophylactic Paste. This paste has a pleasant odor and does much to correct halitosis. After teeth have been cleaned with the brushes and prophylactic paste, rubber polishing cups and more prophylactic paste are used. This process puts a high polish on teeth, leaving them shiny and bright.

During the scraping, brushing, and polishing process, we observe all loose teeth and extract them after the polishing is com-

Fig. 3. Brushing of teeth with one type of three different types of brushes. Polishing is done in similar manner with rubber polishing cup and prophylactic paste.

pleted. Often a spot or two is retouched next to an extracted tooth. The gum line is then painted with Di-O-Chrome and the period of anxious waiting for an anesthetized dog to wake up is started. During the operation, we use a rubber bulb syringe to spray water on the teeth and gums and make certain that all water runs out of the mouth. Teeth are then wiped with a towel.

During the work it is well to have the dog's head on a thick towel so that it can be used to wipe instruments. Unless a gown is worn, a towel around the neck is necessary because water, pumice, and tartar is apt to fly from the patient's mouth.

The only precautions suggested by experience are as follows: (1) Have sufficient time to do the job; that is, do not try to clean the teeth of old dogs on a busy day, (one or two poor risks under anesthesia at one time is enough to worry about). Dental work on these dogs should be accomplished early in the morning so that the animal can be up and about or home by evening. (2) Precaution must be exercised in using polishing brushes and cups. If run too long on one spot, heat created by friction can damage teeth.

One of the female assistants at the clinic is a dental technician who does the actual cleaning and polishing. Veterinarians only anesthetized the patient and extract teeth. However, we always inspect each tooth with her after the job is completed so that we have first-hand information about the dog's mouth. In some cases, tablets with vitamin C and niacin are dispensed for the gums.

Mortality experience in dental patients has been low at our clinic, but we always explain the danger of anesthesia to the owner. In nearly every case, the owners are pleased and they usually report that the dog feels a good deal younger, has more energy, is more interested in eating, and in general, has a brighter outlook on life. We believe that a properly cleaned set of canine teeth does much to detoxify the dog and is well worth the effort and risk involved.

The dog that is given Senazol a month or six weeks following surgery seems to show more improvement than the old dog not receiving Senazol. Regardless of geriatric medication, clinical results following this type of teeth cleaning will convince one that many dogs are suffering from a toxic condition from the mouth even though we as veterinarians can see no evidence of such toxicity.

Biological Investigations

It was interesting, and in a measure informative, to read in the June 13, 1958 issue of *Science* about biological investigations reported by the Soviets in an article entitled Research Based on Sputniks I and II. The biological report deals with the reactions of the dog placed orbit in Sputnik II.

Some of the reported dog's reactions are as follows:

1. During ascent the weight of the dog increased greatly because of the rapid speed of Sputnik pressing the animal to the floor of its chamber.

2. Immediately after launching, frequency of heart contractions trebled; but later, when acceleration of Sputnik diminished, the dog's heart action returned to normal. Electrocardiograms revealed no morbid signs.

3. When Sputnik entered its orbit a condition or state of weightlessness set in so that the dog easily contracted its leg muscles and pushed itself off the floor. Frequency of breathing declined. Motions of the animal "were moderate.

4. Normalization of blood circulation and respiration during the period of weightlessness indicates "that this factor in itself did not cause any essential and stable changes in the state of the animal's physiological functions."

5. Since the animal was in a sealed chamber, provision had been made to maintain normal composition and pressure of surrounding gases. This was satisfactorily accomplished by highly active chemical compounds that absorbed noxious gases and water vapor, and emitted oxygen in sufficient amounts.

Effect of Varying Doses of Piperazine Citrate on Puppies

J. GREENBERG,* M.S., W. E. SEYMOUR,† D.V.M. and A. F. McEWEN,† V.M.D.

Richmond, Virginia and Washington, D.C.

RECENT WORK has shown the simple salts of piperazine to be efficient ascaricides in various species of animals and in man.[1-7] These salts are palatable, non-toxic, easy to administer, and therapeutic doses do not produce undesirable side effects.[8,9] These characteristics contrast sharply with older, more complex salts of piperazine.[10]

Materials and Methods

Piperazine citrate was used with pharaceutical grade (approximately 36% anhydrous piperazine). Each dose unit was contained in a hard gelatin capsule. In all cases, contents of the required number of capsules were mixed with about one-half the food to be fed. After the dosed food had been consumed, the rest of the meal was fed. Dogs treated were clinical cases presented for treatment, except when otherwise noted. Fecal examinations by the saline smear method were made on 233 of the clinic treated animals concerned in this report (186 dogs and 47 cats). Those animals exhibiting both hookworm and ascarid infection were first treated with piperazine citrate to remove the ascarids before hookworm treatment was begun. Results are summarized in tables 1 and 2.

Since it appears that effectiveness against ascarids is directly related to the size of the dose,[11] a dosage of 10 gr. per 7 lb. body weight was selected. This dosage was tested for acceptability and side effects, as well as for effectiveness in dogs and cats.

Thirty-one dogs and 2 cats were treated. Twenty-six of the dogs were puppies weighing ten pounds or less; the cats weighed slightly more than two pounds each. Vomiting was observed in ten of the 26 (33.5%) young dogs within two hours. Neither of the two cats or seven older dogs vomited. Vomiting had been previously reported only in mature dogs when massive doses of 2 gm. of piperazine citrate per kg. of body weight were administered, although 1 gm. kg. (equivalent to 48.9 gr./7 lb.) was tolerated.[12] Since there appeared to be a correlation between the reaction to the dose, age, and weight of the dogs, all further work was confined to the detection of vomiting in puppies.

The dose was reduced to 8 gr./7 lb. body weight with an immediate decrease in incidence of vomiting. Two out of seven puppies vomited (28.6%). The dose was modified to 7 gr./5 lb. body weight with a still further decrease in the number of puppies vomiting. Seven out of 114 vomited (6.1%). Seventy of the animals were not clinical cases.

Included in this group were three litters

*Polk Miller Products, Richmond, Va.
†Hospital for Animals, Washington, D. C.

TABLE 1. Vomiting in Dogs When Treated with Varying Doses of Piperazine Citrate

No. Capsules	6 gr./5 lb. Treated	6 gr./5 lb. Vom.	7 gr./5 lb. Treated	7 gr./5 lb. Vom.	8 gr./7 lb. Treated	8 gr./7 lb. Vom.	10 gr./7 lb. Treated	10 gr./7 lb. Vom.
1	76	2*	79	5	7	2	18	6
2	65	0	35	2	—	—	8	4
3	21	3*	2	0	—	—	2	0
4	1	0	2	0	—	—	3	0
5	4	1**	3	0	—	—	—	—
6	6	0	2	0	—	—	—	—
Total	173	6	113	7	7	2	31	10

*Regurgitated small amount, ate vomitus, passed ascarids.
**Highly nervous excitable dog. Subsequently wormed at home without vomiting.
Vom.—vomited.

of foxhounds (20 puppies) which were dewormed at four to five weeks of age (weights ranged from 2½ to 5¾ lb.). One puppy received a 14 gr. dose, the others 7 gr. each. The puppy receiving the larger dose vomited, the others did not. These puppies had been on semi-solid food for one week and were still nursing. One week later they were dewormed again. Weights now ranged from 3½ to 7 lb. and five puppies received 14 gr. of piperazine citrate. No cases of vomiting were observed.

A reduction of the dose to 6 gr./5 lb. body weight resulted in only two cases of vomiting in the 141 puppies weighing 10 lb. or less that were treated (1.4%). Fifteen of these puppies were dewormed at home with no vomiting. The amount of food regurgitated was also less than that resulting from the 10 gr. dose. The two puppies that vomited ate the vomitus and subsequently passed ascarids. Dosed food was completely acceptable.

It should be noted also that dogs which vomited the 6 gr. dose when administered under clinical conditions were able to retain such medication when fed at home in accustomed surroundings.

The fecal examinations showed only four dogs and none of the cats to be negative for ascarids (1.7%). An estimated 90% of these animals were negative for hookworms. Ascarids were eliminated from all animals harboring them. Young kittens exhibited greater tolerance for the larger doses of piperazine citrate than puppies.

Conclusion

Piperazine citrate administered in the food in a dose of 6 gr./5 lb. body weight to young dogs did not result in vomiting directly attributable to the medication. The drug was completely effective against ascarids. As the dose was increased in young puppies, vomiting occurred. Younger and smaller puppies were more sensitive to increased doses than older animals of the same species. Kittens were not as sensitive as puppies.

REFERENCES

1. White, R. H. R., and Standen, O. D., Piperazine in the Treatment of Threadworms in Children. *Brit. Med. Jour.*, 2:755, 1953.

2. White, R. H. R., Ascariasis Treated with Piperazine Hydrate. *Lancet*, 2:315, 1954.

3. Brown, H. W., and Sterman, M. M., Treatment of *Ascaris lumbricoides* Infections with Piperazine Citrate. *Am. Jour. Trop. Med. & Hyg.*, 3:750, 1954.

4. Shumard, R. F., and Eveleth, D. F., A Preliminary Report on the Anthelmintic Action of Piperazine Citrate on *Ascaridia Galli* and *Heterakis Gallinae* in Hens. *Vet. Med.*, 50:203, 1955.

5. Bradley, R. E., Observations on the Anthelmintic Effect of Piperazine Citrate in Chickens. *Vet. Med.*, 50:444, 1955.

6. Bradley, R. E., Crimmins, L. T., and Zweigart, T. F., Preliminary Studies on the Anthelmintic Properties of Piperazine Citrate in Dogs. *Jour. Am. Vet. Med. Assn.*, 128:393, 1956.

7. Mann, P. H., Harfenist, M., and de Beer, E. J., The Effectiveness of Piperazine Citrate Against Intestinal Helminths of the Cat and Dog. *Jour. Parasitology*, 41:575, 1955.

8. Sloan, J. E. N., Kingsbury, P. A., and Jolly, D. W., Preliminary Trials with Piperazine Adipate as a Veterinary Anthelmintic. *Jour. Pharm. and Pharmacology*, 6:718, 1954.

9. Riedel, B. B., and Larson, E. J., The Critical Evaluation of a New Swine Anthelmintic Containing Piperazine and Carbon Disulfide—Parvex. *Jour. Am. Vet. Med. Assn.*, 129:156, 1956.

10. Jones, L. M., Veterinary Pharmacology and Therapeutics, Iowa State College Press, Ames, Iowa, 1954, pp. 490, 532.

11. Standen, O. D., Activity of Piperazine, in Vitro, Against *Ascaris lumbricoides*. *Brit. Med. Jour.*, 2:20, 1955.

12. Hayes, F. A., Piperazines and Intestinal Parasite Control. Collected Papers Gaines Veterinary Symposium, 1956.

TABLE 2. Vomiting in Cats When Treated with Varying Doses of Piperazine Citrate.

No. Capsules	6 gr./5 lb. Treated	Vom.	7 gr./5 lb. Treated	Vom.	10 gr./7 lb. Treated	Vom.
1	24	1*	12	3**	2	0
2	10	0	4	1**	—	—
3	1	0	—	—	—	—
Total	35	1	16	4	2	0

*Vomiting prior to treatment, heavily infested.
**These cats belonged to one owner who failed to follow instructions.
Vom.—vomited.

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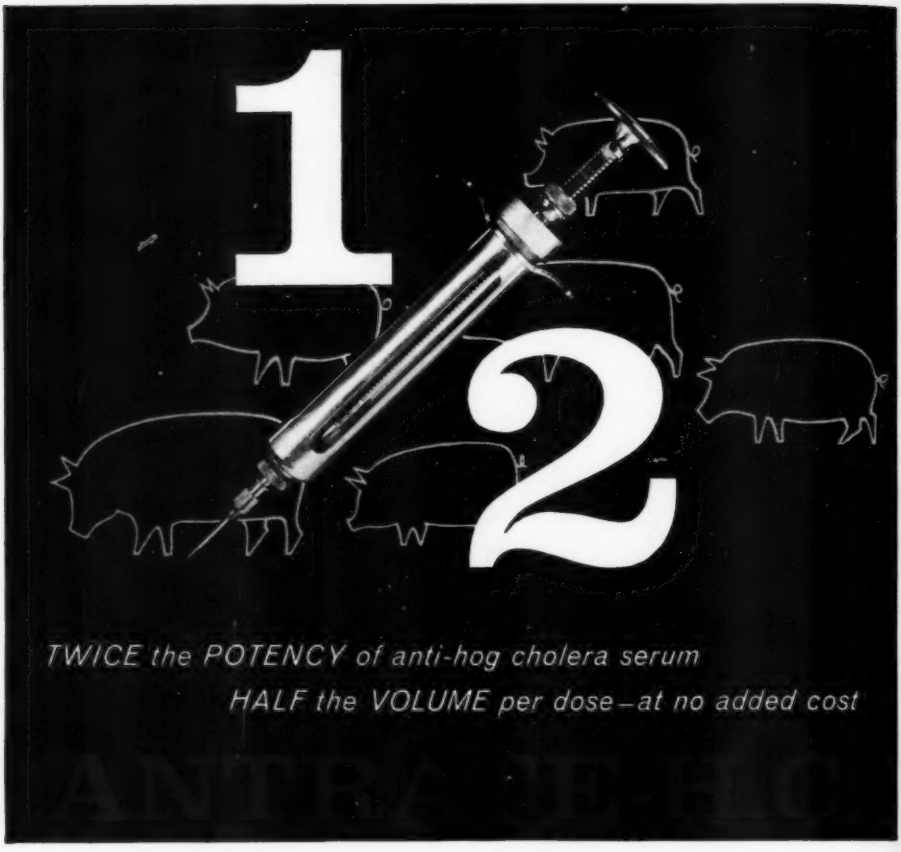

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This is the second in a series of three articles on immunization of cattle against leptospirosis. In this report controlled studies are reviewed to indicate that vaccinated heifers retain immunity as long as 20 months after vaccination. Aspects of artificially induced and naturally acquired resistance are discussed.

Immunization of Cattle Against Leptospirosis

II. Further Observations on Duration of Immunity Induced by Vaccination

R. W. H. GILLESPIE, Ph.D. and S. G. KENZY, D.V.M., Ph.D.

Pullman, Washington

THE first report of this series[1] showed that cattle vaccinated when six to eight months of age with *L. pomona* bacterins acquire substantial resistance to infection. When challenged, 11 of 12 vaccinated heifers resisted infection. It was also demonstrated that calves vaccinated when about one to two months of age acquire little resistance. Only four of 17 vaccinated calves resisted infection on challenge. There was evidence, however, that vaccinees which became infected experienced disease in a milder form and "shed" fewer leptospires than controls.

The present report is concerned with exposure of heifers vaccinated at six to eight months of age and challenged 13 to 15 months (group 4) and 18 to 20 months (group 5) after vaccination. The primary objectives of these studies were to determine the degree and duration of resistance induced by *L. pomona* bacterins (three products tested) as manifested either by prevention of infection or modification of the severity of the disease.

Scientific paper 1724, Washington Agricultural Experiment Stations, State College of Washington, Pullman. Projects 1176 and 144.

Materials and Methods

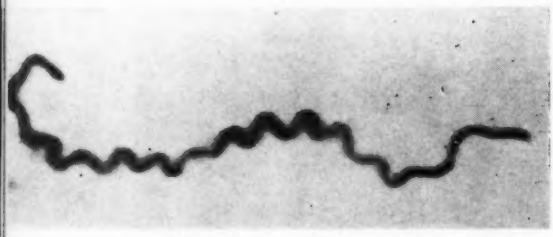
Detailed information relative to materials and methods, given in the first publication of this series,[1] is summarized here for the convenience of the reader.

Animals. Immunization data on cattle used in the current studies are presented in table 1. These animals were challenged in two equal groups; each consisted of 12 vaccinated heifers and each had its own component of nonvaccinated controls.

Bacterins. Three bacterins were used. No. 1 was a commercial product Leptogen (Pitman-Moore). No. 2 was an aureomycin-killed culture bacterin prepared for our use by a biological supply company.* The third was produced in our laboratory from pooled cultures of recently isolated strains. It was a formalin-killed product, final concentration: 0.2% formalin.

Strain of L. pomona Used for Challenge. The strain (REA) used for this purpose was isolated during field studies conducted

*Veterinary Clinical Research Division, American Cyanamid Company, Pearl River, N. Y.



Leptospira pomona organism as seen through electron microscope.

on animals in a herd in which fatal cases of the disease had occurred. The strain was maintained, subsequent to original isolation (November, 1953) primarily by continous passage in cattle. Occasionally, however, infectious material (bovine urine, blood, or infected hamster kidney) was preserved for long intervals in the "dry-ice" box.

This strain continued to show evidence of virulence throughout the period required for these studies. During this period it was apparently responsible for two abortions and the death of three calves.

Method of Challenge. Urine from "shedder" cattle was diluted 1:5 with tap water** containing several tablespoonsful of kaolin per liter. About 0.5 ml. of this dilution was instilled into the eyes and 25 to 30 ml. into the nostrils. The drinking water provided for the animals was kept continually contaminated for a week to ten days by frequent additions of "shedder" urine. Table 2 summarizes the challenge data.

The "shedder" urine was frequently examined for motile leptospires during the challenge period. The infectious material (both diluted urine and contaminated water) was tested, during and after use, to determine whether viable leptospires were still present.

Criteria of Infection. Either the appearance of agglutinins at high titer, or a clearly defined increase (100-fold or more) over the vaccination titer, was found to be a reliable criterion of infection in vaccinated cattle. In addition, (1) every effort was made to detect leptospires in urine specimens of cattle that became seropositive; (2) rectal temperatures were followed daily during the

**The tap water was alkaline (pH 7.6 — 7.8). To neutralize the traces of chlorine that could usually be detected in this supply, a few crystals of sodium thiosulfate were added. Any chlorine that may have been present in the drinking water was neutralized in the same way.

TABLE 1. Cattle Challenged 13 to 15 Months (Group 4) and 18 to 20 Months (Group 5) after Vaccination

No. of cattle	Age when vaccinated (mo.)	Bacterin*	Vaccination date**
10 Heifers	6 to 8	No. 1 (commercial)	3- 4-54
10 Heifers	6 to 8	No. 2 (commercial)	4-15-54 (5); 5-13-54 (5)
4 Heifers	6 to 8	WSC (experimental)	3- 4-54

*All products were killed suspensions of *L. pomona.*

**Each animal received a single 5.0 ml. dose of bacterin subcutaneously.

critical period; and finally (3) blood specimens or samples of milk from lactating cows were sometimes inoculated into laboratory animals as further attempts to detect the spirochetes. Titration of the protective properties of sera was employed to substantiate serological evidence of infection when the infectious agent could not be detected.

Groups Challenged. The 24 vaccinated heifers were challenged in two groups of 12 each. The composition of these groups, *i.e.*, the number of vaccinees, the bacterins they received, the interval between vaccination and challenge and the number of control animals employed, are included in tables 4 and 5.

Results

Examination of Infectious Material. Motile leptospires were regularly demonstrated by darkfield examination in "shedder" urines used to expose these two groups. Viable organisms were also detected and sometimes titrated by inoculation of hamsters with infectious material during or after use. When one lot of diluted urine employed for exposure of group 4 was titrated, both of the hamsters that received 0.5 ml. of a 1:50 dilution became seropositive but the two that received 0.5 ml. of 1:500 dilution did not. Titration of a tank of contaminated water was begun on the following day. After mixing the "shedder" urine into the water, samples were taken at intervals up to the fifth day for inoculation into hamsters. The results of this titration are given in table 3. Additional tests for infectivity of both types of infectious material were made during exposure of both of these

TABLE 2. Challenge Data

Challenge group	Age when vaccinated (mo.)	Substrain used represents:	Infectious urine administered through
4	6 to 8	6th bovine passage*	Eyes and nostrils (4 days, twice daily) Drinking water** (11 days)
5	6 to 8	7th bovine passage*	Eyes and nostrils (4 days, twice daily) Drinking water (6 days)

*A single hamster pasage with subsequent storage of the hamster kidney in the "dry-ice" box intervened between 4th and 5th and 6th and 7th bovine passages.

**The drinking water was kept contaminated by frequent additions of "shedder" urine. Leptospires survived in the water for at least 5 days (see table 3).

groups of cattle. These tests regularly showed the presence of viable leptospires.

Results of Challenge. The results of challenge of these two groups are given in tables 4 and 5 and summarized in table 7.

Group 4. (See Table 4). Eight of the 12 vaccinees and all five controls became infected as result of challenge. The four cattle that resisted infection showed the following distribution: One of the five vaccinated with no. 1, two of the five with no. 2 and one of the two with WSC bacterin. Thus no one of the three bacterins exhibited evidence of superiority.

As was observed in the earlier studies, some correlation seems to exist between serological response to vaccination and resistance to infection. In this experiment, the relationship between resistance and the persistence of the blood titers from vaccination is apparent. Thus, prechallenge sera from only three of the 12 vaccinees showed clear-cut agglutination at 10^{-1} dilution. These three were among the four that resisted infection. There was some evidence in this trial that vaccinated cattle which became infected "shed" fewer leptospires than controls. Organisms were excreted by 5/8 vaccinees and 4/5 controls. Leptospires were detected by darkfield examination in urines from 3/4 "shedders" in the control group. By contrast, only 1/5 vaccinees were positive microscopically. Inoculations of hamsters was necessary to detect "shedding" by 4/5 vaccinees but only 1/4 controls. (This method is presumably a more critical test for the presence of small numbers of *L. pomona* than darkfield examination.)

This group provided an opportunity for observation on the effects of exposure during pregnancy. Six of the heifers were pregnant when exposed. (See footnotes, table 4). Three heifers, two vaccinees (no. 22 and 9) and one control (no. 83) were in the second tri-mester. The other three, all control animals (no. 134, 135 and 136) were in late stages of pregnancy. One of the latter (no. 136) produced, with manual aid, a dead fetus, apparently near term, 32 days after beginning of exposure. The other two in this group produced normal calves, one 15 and the other 33 days after exposure was begun. Two of the three mid-term heifers, one a vaccinee, the other a control, became infected but neither experienced any difficulty. Thus, only one of the five gravid heifers that became infected on challenge aborted. It was a control animal and was one of the three in the last month of pregnancy.

TABLE 3. Titration of Degree and Duration of Infectivity of Contaminated Water (6-17-55)
(Serological data on hamsters 5½ weeks after inoculation)

Inoculum	45-min. sample	3-hour sample*	6.5-hour sample	9-hour sample	32-hour sample	5-day sample
1.0 ml. undil.	+	+	+	....	+	+
0.1 ml. undil.	+	+	....	+	....	....
0.5 ml. 10^{-1}	+	+	+	—	(died)	....

*At the 3-hour interval, the sample was collected in a sterile 500 ml. cotton-plugged flask. This flask was kept on a shelf in the room that housed the cattle and served, thereafter, as the source of test samples. (This procedure was necessary, because subsequent additions of urine to the tank would have prevented further observations on survival of the leptospires.)

+Hamsters became seropositive following inoculation with the contaminated water.

—This hamster did not become seropositive.

Our studies now include a total of six unvaccinated first-calf heifers exposed to infection during late pregnancy. Two, including the one just described, have aborted. The other four (no. 134 and 135 and two others[8]) have produced normal calves while actively infected (*i.e.*, while excreting leptospires in the urine).

Except for the abortion, there was very little clinical evidence of infection in this group. The two control heifers that calved normally became febrile, one on the sixth and the other on the tenth day after exposure. No evidence of hemoglobinuria or hemolytic anemia was noted in any of the infected animals.

The organism was not detected in the stillborn fetus or in the fetal membranes or placenta by inoculation of the tissues into hamsters. Placental and fetal membranes from one of the two heifers that calved normally also gave negative results when examined for *L. pomona*. Attempts to detect the organism in pre-partum lacteal secretions from all three heifers 12, 17, 20, 23 and 30 days after exposure were unsuccessful. However, one of the controls (no. 137), a cow that had calved six days prior to exposure, excreted leptospires in its milk (as determined by hamster inoculation) on the third and sixth day after exposure began†. Her milk was not infective for hamsters on the first and second day of challenge, nor 8, 12, and 17 days after exposure was begun.

The calves, although born to infected mothers and in an environment contaminated by additional convalescent carriers, exhibited no evidence of infection. They became seropositive shortly after nursing, since colostrums of their dams contained relatively high concentrations of agglutinating antibody at the time of parturition.[8]

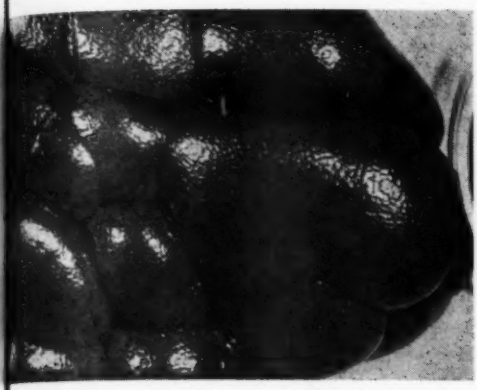
Group 5. (See Table 5). Four of the 12 vaccinated heifers and all six controls became infected when challenged 18 to 20 months after vaccination. Three of the four vaccinees that became infected had received bacterin no. 2. In this experiment, resistance to infection failed to show a clear-cut correlation with the serological response to vaccination. Furthermore, perhaps owing to increased resistance associated with maturity, the vaccinees and the controls of

†At the time the organism was detected in the milk of the cow she had a post-partum metritis that was being treated with Stilbestrol

TABLE 4. Challenge Results with Heifer-Vaccinees (Group 4) 13 to 15 Months after Vaccination

Animals No.	Status	Serological titers (A-L* Test) Post-vac. (6 wk.)	Pre-chall.	Post-chall. (6 wk.)	Clinical Data Fever (max.)	Leptospiruria (number "shed")**	Resisted infection+
1	No. 1 vac.	10^{-2}	—	10^{-2}	none	none detected	
3	No. 1 vac.	10^{-2}	10^{-1}	10^{-1}	....	....	
7	No. 1 vac.	10^{-1}	—	10^{-3}	none	few	1/5
18	No. 1 vac.	10^{-1}	—	10^{-3}	none	very few	
22++	No. 1 vac.	±	—	10^{-3}	none	very few	
33	No. 2 vac.	10^{-1}	—	10^{-3}	none	very few	
39	No. 2 vac.	10^{-2}	±	10^{-3}	none	very few	
40	No. 2 vac.	10^{-2}	10^{-1}	10^{-2}	....	....	2/5
56	No. 2 vac.	10^{-1}	±	±	....	....	
57	No. 2 vac.	10^{-1}	±	10^{-2}	none	none detected	
9++	WSC vac.	10^{-2}	10^{-1}	10^{-1}	....	....	1/2
16	WSC vac.	10^{-1}	—	10^{-3}	none	none detected	
83++	Control	....	—	10^{-3}	none	none detected	
134†	Control	....	—	10^{-4}	104.8	few	
135†	Control	....	—	10^{-4}	103.4	few	0/5
136††	Control	....	—	10^{-4}	none	few	
137†††	Control	....	—	10^{-3}	none	very few	

*Agglutination-lysis test; ± = weak reaction.
**None detected = either by darkfield examination or hamster inoculation.
Very few = not observed by darkfield but recovered by hamster inoculation.
Few = small numbers observed by darkfield examination.
+Ratios of numbers resisting infection to numbers exposed.
++These heifers were in the 2nd trimester of pregnancy; they were still carrying their calves when sold several months later.
†These heifers calved normally 15 and 33 days, respectively, after exposure began.
††This heifer delivered (with manual aid) a dead fetus, near term, 32 days after exposure began.
†††This cow was lactating when exposed. *L. pomona* was isolated by inoculation of her milk into hamsters on the 3rd and 6th days after exposure began. (Hamsters inoculated on the 1st, 2nd, 8th, 12th and 17th days remained seronegative.)



Bovine kidney exhibiting brownish foci resembling hemorrhage.

comparable age (no. 132 and 133) showed no definite differences in the number of leptospires "shed." Only one of the older animals, a control, had a febrile reaction (103.4 F. on the tenth day). It is interesting to note the apparent difference in severity of the disease experienced by the older (two plus years) and younger (six-seven months) cattle in the control group.

In contrast to the other challenge groups in this series of studies, the vaccinees in Group 5 were all pregnant when exposed to infection. All but one (no. 15) were estimated to be past mid-term, whereas six were actually in or near the last trimester. Of four that became infected, one (no. 15) was four months pregnant, two (no. 30 and 58) calved about three months and one (no. 20) about three weeks after exposure. (See table 6 for data correlating pregnancy status with incidence of infection.)

None of the four calves born in the infected environment, one during exposure of the group and the others within three to five weeks thereafter, became infected.

Discussion

It appears that cattle vaccinated when six to eight months-of-age with one 5.0 ml. dose of *L. pomona* bacterin may still resist infection 18 to 20 months after vaccination, even though exposed repeatedly through several routes to "shedder" urine. This is clearly evident when the incidence of infection among vaccinees is contrasted with the incidence among unvaccinated controls.

The results obtained with the several groups are obviously not entirely comparable. In attempting to simulate natural routes of entry in the process of exposure,

TABLE 5. Challenge Results with Heifer-Vaccinees (Group 5) 18 to 20 Months after Vaccination

Animals		Serological titers (A-L* Test)			Clinical Data		Resisted infection+
No.	Status	Post-vac. (6 wk.)	Pre-chall.	Post-chall. (6 wk.)	Fever (max.)	Leptospiruria (number "shed")**	
2	No. 1 vac.	10^{-2}	—	±	....	....	4/5
5	No. 1 vac.	10^{-2}	±	10^{-1}	....	....	
8	No. 1 vac.	10^{-1}	±	10^{-1}	....	....	
19	No. 1 vac.	10^{-2}	±	10^{-1}	....	....	
20	No. 1 vac.	—	—	10^{-3}	none	none dectected	
15	No. 2 vac.	±	—	10^{-3}	none	few	2/5
30	No. 2 vac.	10^{-2}	—	10^{-5}	none	none dectected	
36	No. 2 vac.	±	—	10^{-1}	....	....	
55	No. 2 vac.	10^{-1}	±	—	....	....	
58	No. 2 vac.	10^{-3}	—	10^{-3}	none	none dectected	
11	WSC vac.	10^{-2}	10^{-1}	10^{-1}	....	....	2/2
12	WSC vac.	10^{-2}	±	±	....	....	
132++	Control	....	—	10^{-3}	103.4	few	0/6
133++	Control	....	—	10^{-3}	none	none detected	
160†	Control	....	—	10^{-4}	103.8	many	
161†	Control	....	—	10^{-4}	106.3	many	
163†	Control	....	—	10^{-4}	104.4	many	
166†	Control	....	—	10^{-4}	104.0	many	

*Agglutination-lysis test; ± = weak reaction.
**None detected = either by darkfield examination or hamster inoculation.
Few = small numbers observed by darkfield examination.
Many = number ranging from many thousands to several million/ml (confirmed by counting-chamber method).
+Ratios of number resisting infection to numbers exposed.
++These two controls were about the same age as the vaccinees (24 to 28 months).
†These four controls were calves 6 to 7 months old.

TABLE 6. Pregnancy Status of Group 5 Vaccinees

Heifer no.	Bacterin	Month of pregnancy when challenged*	Calved	Infected on challenge
2	No. 1	6	**	—
5	No. 1	8	11- 7-55	—
8	No. 1	8	12- 9-55	—
19	No. 1	5	3- 9-56	—
20	No. 1	8	11-26-55	+†
15	No. 2	4	**	+††
30	No. 2	7.5	2- 6-56	+†
36	No. 2	8	11-23-55	—
55	No. 2	5.5	2-29-56	—
58	No. 2	5.5	2-11-56	+†
11	WSC	7.5	2-17-56	—
12	WSC	5	**	—

*Challenged 11-4 through 11-9-55.
**These heifers were carrying calves when sold, about 3 months after challenge.
†Did not "shed" leptospires in the urine.
††"Shed" a few leptospires.

strictly quantitative measurements of dosage had to be disregarded. However, the urine used as infectious material was examined by darkfield at frequent intervals during exposure. Furthermore, the infectious material (diluted urine) used for instillation into eyes and nostrils and the contaminated drinking water were frequently tested (and occasionally titrated) in weanling hamsters for infectivity before and after use.

It was felt, as stated in the first report, that multiple exposure to large amounts of grossly infected urine would probably equal, and possibly often exceed, doses that would be experienced under natural conditions.

Certain other factors were not subject to control because of the nature of the experiment. The age of the animals at the time of exposure may be an important factor in determining whether infection occurs, and its severity if it does occur. Cattle tend to become more resistant as they mature. Actually, on the average, it became increasingly difficult to detect "shedding" in each successively older group of adult controls. It was not found practical to control completely other theoretical influences such as physiological status, *i.e.*, (1) estrus, (2) pregnancy status and (3) parturition; and (4) surgical procedures; (some animals in the adult vaccinate groups were dehorned shortly before exposure). Seasonal and other environmental conditions may also have affected susceptibility.

It seems possible, particularly in view of recent knowledge concerning the influence of enhanced resistance to the "shock syndrome" during pregnancy, that this condition in the group 5 vaccinees may at least partially account for the apparent discrepancy between the results with this group and with group 4. The latter group had only two pregnant animals among the vaccinees, both near mid-term. In group 5, all of the vaccinated animals were pregnant and all but one were past mid-term. Only four of the vaccinated animals in group 5 became infected, in contrast to eight in group 4, and this in spite of the additional time (five months) that had elapsed between vaccination and challenge of group 5. Only one of the four group 5 vaccinees that "broke" (no. 20) was near term.

Some effort has been made to determine whether any change in the serological status of the animal occurs during pregnancy. No change in titers of agglutinins in blood samples has been observed during gestation, either in vaccinated heifers or in cows that have recovered from infection. Nevertheless,

TABLE 7. Summarized Data—Comparative Evaluation of *L. pomona* Bacterins (Method of Challenge: Repeated Exposure to Urine From a "Shedder" Through the Eyes, Nostrils, and Drinking Water)

Challenge groups & age when vaccinated	Vaccination-challenge interval	Ratio of infected to exposed					Vaccinees resisting infection (totals)
		Bacterin No. 1	Bacterin No. 2	WSC	Total vaccinees	Controls	
Group 4 (6 to 8 mo. heifers)	13-15 mos.	4/5	3/5	1/2	8/12	5/5	4/12
Group 5* (6 to 8 mo. heifers)	18-20 mos.	1/5	3/5	0/2	4/12	6/6	8/12
Controls, total						11/11	

*All of this group of vaccinees (but not the controls) were pregnant (6/12 were in the last trimester) at time of exposure. Only three of previously challenged vaccinees (all in group 4) were pregnant, and in the first trimester when exposed.

we have observed[4] an apparent overall increase in the production of antibody during late pregnancy; both agglutinins and protective antibody are secreted in the colostrum in as high, and often actually higher, concentration than in the blood.

The results of challenge of these two groups tend to substantiate further earlier observation in favor of vaccination. The three bacterins continue to show essentially similar immunizing values. The apparent correlation between the extent of serological response to vaccination and resistance to infection reported earlier is further supported by the results obtained with group 4. The results with this group also tend to support the postulate proposed in the earlier report, that vaccination tends to reduce the severity of the infection even though it may fail to afford complete protection. This concept is manifested in the more frequent occurrence of afebrile cases and a reduced tendency to "shed" the organism among vaccinees that "break" on challenge than among controls.

Summary

1. Heifers vaccinated with *L. pomona* bacterins when six to eight months-of-age continued to exhibit some degree of protection against infection when challenged 13 to 15 and 18 to 20 months after vaccination.

2. A correlation seems to exist between the serological response to vaccination and the degree of immunity, as previously reported.

3. The apparent reduction of severity of the disease, with suppression of "shedding," even though infection may occur, is further evidence of resistance in vaccinees. Those vaccinated cattle that became "shedders" usually excreted so few organisms that leptospires could not be detected by darkfield examination.

4. One abortion followed infection in a control heifer in the eighth month of gestation. Other pregnant heifers, among both vaccinees and controls, did not abort.

5. Certain other aspects of artificially induced and naturally acquired resistance that may influence the natural history of leptospirosis in cattle are discussed.

Acknowledgment

The authors are especially indebted for able technical assistance to Adrienne Birdsell and also to student assistants Merrill Shupe and Keith Hoopes.

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The funds used for the construction of facilities employed in these studies and for the purchase of the experimental cattle were provided by a special grant from the Governor's reserve fund.

REFERENCES

1. Gillespie, R. W. H., and Kenzy, S. G., Immunization of cattle against leptospirosis. I. Comparative evaluation of *Leptospira pomona* bacterins. *Vet. Med.* 53:401, (Aug.) 1958.
2. Unpublished data.
3. Unpublished data.
4. Unpublished data.

Artificial Insemination

Although artificial insemination of swine did not progress beyond the research stage in Canada during 1957, over 10% of the nation's 5,038,600 cattle were bred artificially last year. Three reasons have been cited by Canada's livestock and poultry products division: (1) Better quality bulls, (2) lower costs and (3) elimination of danger possible to farmers who keep bulls.

All Canadian provinces with the exception of Newfoundland have artificial insemination centers. During the past year there were 17 semen-producing and 131 semen-purchasing organizations in operation; 334 dairy, 24 dual-purpose and 105 beef bulls were in service.

Zinc Deficiencies of Poultry

R. C. KLUSSENDORF, B.S., D.V.M.

Terre Haute, Indiana

AT THE 1957 MEETING of the Poultry Science Association, a group of workers met in an impromptu session to discuss some observations involving or suggesting zinc deficiencies in birds consuming rations presumed to be normal and complete. Attention has been focused on this subject by the more precise analytical methods available and the basic realization that zinc is essential for the proper functioning of several enzyme systems; and that these, in turn, determine the efficient utilization of nutrients by the body.

At the meeting mentioned a number of abnormalities were mentioned, and attention was directed toward an interaction between zinc and several other minerals—major and minor. The possible or probable effects on the functioning of specific enzyme systems was not discussed. Neither was the manner or pathway through which a deficiency of zinc might interfere with the utilization of nutrient substances provided by the feed.

A tendency for the long bones—especially the femur and tibia—to become short, thick, and flat rather than retain the normal long, slender, round, and firm characters, was noted in chicks fed rations containing as little as 15 p.p.m. of zinc. Supplemental zinc tended to reduce the incidence or prevent the condition.

The feathers of certain lots of chickens and turkeys were straggly and upkempt. The ration proved to be low in zinc. Microscopic examination of the feathers showed that the barbs developing on each side of the shaft or quill to form the vane were abnormal. They did not develop the tiny barbules which normally interlock to keep the feathers orderly and smooth. When supplemental zinc was added to the ration the incidence of the condition was reduced, or it disappeared completely. Whether this is related to the hairy-turkey condition sometimes observed was not established.

Hock enlargement in turkeys was produced consistently on a ration containing 2% calcium. The swelling was readily observed at the age of one week. At two weeks some birds had recovered while others were noticeably more severely affected. This trend persisted, some birds recovered with age while others developed the lesions more prominently. Zinc supplemented at the rate of 0.58% (5,800 p.p.m.) did not completely correct the condition. The interaction of manganese in this connection was not discussed.

Dermatitis developed on the feet and legs of turkeys. This sometimes responded to supplemental zinc, and consistently responded when wheat was added to the formula to constitute 15 to 20% of the ration. The question of a concurrent selenium imbalance is raised.

The zinc content in normal feed ingredients varies widely, so that results and conclusions from previously reported tests should be reexamined with this in mind. Even the purified proteins may contain as much as 27 p.p.m. of zinc, of which only 12 p.p.m. remains after careful washing.

The type of equipment used to house, feed, and water the birds can be highly important—the use of plastic or stainless steel throughout may result in a response which varies widely from that obtained when the usual galvanized metal cages, feeders, and fountains are used with birds from the same hatch and eating the same ration.

Continued on page XXVIII

Editorial

VETERINARY EDUCATION and CHANGING DEMANDS of PRACTICE

In contrast to the obsolecence predicted for veterinary medicine at the close of the horse era, increased services for other domestic animals and pets have been responsible for the greatest growth in the history of the profession. In fact there seems to be no end to the broadening spectrum of veterinary services demanded by the American public.

Today every community expects it's veterinarian to be an authority on matters pertaining to any living animal, bird or reptile, with the possible exception of man. Even here physician friends rely heavily on their veterinary colleagues for help on special problems such as parasitology and diseases transmissible from animal to man. We are allowed the privilege of specializing in the field of our choice but our authoritative consideration of any and all problems is expected.

The departure of the horse shook veterinary education to the very backbone of its equine skeleton, but the professional stature enjoyed today is a direct reflection of long range vision and adaptability of educators and pioneering practitioners. The public brings their diversified problems to the veterinarian because veterinary medicine has recognized and met new problems successfully before.

Writing in the September 1958 issue of *All Pets* magazine, Dr. L. E. Boley reports latest efforts at the University of Illinois, School of Veterinary Medicine in fortifying students with basic knowledge in a rapidly growing new field.

The article points out that there are 15,000,000 budgerigars, 7,000,000 canaries, 1,000,000 finches and other aviary birds, 125,000,000 tropical fish, 50,000,000 goldfish, 15,000 skunks, 3,500,000 turtles and 125,000 monkeys maintained as pets in the United States. The public is demanding more and better veterinary service for these species.

To stimulate interest in birds and fish among veterinary students, the small animal teaching clinic at the University of Illinois, with the help of *All Pets* magazine and a local pet shop, have started a modest collection of birds and an aquarium. Birds and fish are located in the hall of the Small Animal Clinic adjacent to the waiting room. Intern groups are assigned on a weekly basis to handle feeding and care. In addition to practical management experience, the student reading and reference room is supplied with the best books on the subject. With the availablity of a new physical plant, an increase in the number of birds and other mammals is anticipated.

Animal Health

R. R. DYKSTRA, D.V.M.

Thin-shelled Eggs

It is the consensus of the geneticists that thin-shelled eggs are largely the result of a hereditary factor. There are other minor causes such as a deficiency in the ration of calcium and magnesium carbonates, as well as small amounts of manganese, phosphorus, and trace minerals (iodine, lead, barium, copper, et cetera). But a hen, for example, receiving an inadequate ration — if she is free of the hereditary taint — will still produce normal shelled eggs. On the other hand poultrymen in attempts to overcome the thin-shelled conditions resort to the feeding of a ration adequate in every respect, but some birds continue to produce the thin-shelled eggs. Other minor secondary factors, in the hereditarily predisposed, are high summer temperatures, advancing age, the end and/or the beginning of production periods, and such disease conditions as Newcastle disease, infectious bronchitis, or almost any devitalizing agency. For the relief of the thin-shelled condition a well balanced ration with adequate amounts of oyster shell, and vitamin D_3 in the form of fish liver oils (irradiated cholesterol is also satisfactory) may be tried. If there is no satisfactory response culling is recommended.

Equine Infectious Anemia

Trylich of the Health of Animals Division outlines of simple supplementary test for the diagnosis of infectious anemia (swamp fever) based on increased serum lipids in suspected cases (*Canad. Jour. Comp. Med. Vet. Sci.*, Feb. 1958). His test is as follows: Add 1 ml. of concentrated sulphuric acid to 2 ml. of serum or plasma. If the serum mixture is shaken it becomes clear, light yellow, or a dirty yellow, but if the mixture becomes opaque and greenish, a high lipid content is suggested. Then the mixture is cooled under running water followed by boiling in a water bath for exactly five minutes, and cooled again. Examined by daylight or preferably against a frosted bulb a positive result is shown when a color change ranging from coffee brown near the bottom of the tube through merging layers of gray to opalescent gray layer at the top. As a check on the foregoing, when a mixture of normal horse serum and sulphuric acid is used and submitted to similar steps, it remains clear, yellowish, or greenish. The author indicates that this is of aid in making a definite diagnosis when previous clinical observations are highly suggestive of infectious anemia.

Conference Noted

During attendance at a recent conference of veterinarians, we interpreted some of the remarks as follows:

In an examination for sterility of cattle in so-called "problem herds," always examine animals for pregnancy. Estrum may occur in some animals that are already pregnant.

Animals may be effected with either ovarian cysts in which the cyst is on an otherwise normal ovary, or cystic ovaries in which there is a minimum of ovarian tissue. A luteinizing agent is recommended in these cases.

In problem herds bred by natural service, trichomoniasis is frequently the cause of failure to settle.

An open flaccid vulva invites vaginal infection.

Greenish white, somewhat granular pus is of frequent occurrence in pyometra.

In order to control the stress incidental to fractures, or the excitement of a vicious sow during partuition, administer a tranquilizer.

Nutrition

MORRIS ERDHEIM, D.V.M.

Amino Acids for Swine

Proteins are used in feeds to supply hogs with amino acids. About 23 amino acids have been recognized in hog feeds. Of these, ten are considered essential. Arginine, histidine, leucine, isoleucine, methionine, lysine, tryptophan, valine, phenylalanine and threonine are essential amino acids in swine nutrition. Cystine can partially satisfy the methionine requirement.

It is generally understood in modern hog feed formulation, that the amino acid balance in the protein is more important than the standard protein level. For example, while the accepted standard for a 25-lb. pig is an 18% protein feed, this level may actually be inadequate if the amino acids are not in proper balance. On the other hand, if the amino acids are precisely balanced, as little as 12% protein in a pig feed may be adequate for normal growth.

Under practical conditions where feeds are made with ingredients commonly used in feed manufacture, 18% pig starters will contribute adequate amounts of essential amino acids. As further work is done in this field and amino acids are made available commercially at reasonable costs, we might find that our feeding standards will change. Pig starters may be made with 16% or lower protein content.

Penicillin

Since penicillin is normally referred to in units by the practicing veterinarian and by grams on the feed tag, the following key is of interest: A gram of procaine penicillin contains 900,000 units.

Vitamin D for Milk Fever Prevention

Based on results of recent tests, feeding 20,000,000 units of vitamin D daily to dairy cows for five days before calving will help protect them from developing milk fever. Hibbs and Pounden, reporting at the Ohio Dairy Day in Wooster, indicate that the previous recommendation of 30,000,000 units of vitamin D per day can be lowered to 20,000,000 units without adversely affecting the results.

The procedure they suggest calls for feeding 10,000,000 units of vitamin D on the feed twice a day. This should be started five days before the cow is due to freshen. The feeding is continued until the day after calving or for seven days (which ever comes first). In no case should the vitamin D be fed for longer than seven days.

One of the problems encountered in such a program is palatability. An approach to this is the use of highly concentrated vitamin D products. This reduces the total amount of product needed, and seems to be less disturbing to the cow.

A vitamin D product with a potency of 200,000 units per gram would contribute the 10,000,000 units needed at each feeding in 50 grams of material — or less than 2 oz. A veterinarian could easily prepare capsules to dispense, and avoid the palatability problem altogether.

Achievement in Agriculture

Achievements in agriculture during recent years are unmatched for any previous period and have posted an enviable record seldom if ever reached by any segment of industry.

Much has been made of the familiar facts that while the population on farms has decreased a third since 1940, production has increased by two-fifths. Adaptation of modern technology has been responsible.

These facts alone suggest the need for readjustment to meet needs of the next 20 years. Demands of more people will require continued improvement in production efficiency, *i.e.*, more and still more returns per acre and per animal unit. As for the latter, reduction of disease losses is the key to improved quality and larger supplies.

Practitioner's Laboratory

W. L. SIPPEL, V.M.D., Ph.D.

Florida Livestock Board
Kissimmee, Florida

Blood Coagulation Time

Determination of the coagulation time of the blood is a simple technic that should be routine before surgery. It is increased in liver diseases interfering with prothrombin formation by that organ (severe parenchymal liver disease) and thereby also serves as a liver function test. It is prolonged in vitamin K deficiency which results from obstruction of the hepatic duct, bile being necessary for absorption of vitamin K. Coagulation time is increased in spoiled sweet clover hay poisoning as the toxic principle, dicoumerol, decreases the blood prothrombin. This can be overcome by vitamin K administration. The active principal of sweet clover poisoning is used in certain rodenticides and confirmatory evidence of cases of accidental poisoning of livestock from this material can be obtained by detecting a prolonged coagulation time, or better, the prothrombin time. A hemorrhagic disease of human infants is caused by rapid (24 hour) depletion of the normally meager vitamin K stores. This is ordinarily overcome by ingestion of bacteria which synthesize vitamin K in the intestinal tract. This condition is possible in animals under conditions of extreme sanitation or if we feed too much antibiotic. It can be detected by coagulation time studies and remedied by vitamin K therapy.

Hemophilia, extensive *x*-ray exposure, leukemia, anaphylactic shock and purpurea also usually result in prolonged clotting times.

The Tests. Gradwohl[1] describes six methods for determining the clotting time. Two of these methods are quite simple and will be described.

Capillary Tube Method. The only materials required are capillary tubes obtainable from laboratory supply houses.[2] Any easily accessible vein (marginal ear vein) is punctured with a no. 11 Bard-Parker blade and the tube, inclined downward, is allowed to fill by capillary attraction. The time of skin puncture is noted. A small piece of the tube is broken off gently every 30 seconds until a fibrin thread is seen to extend between the ends carefully drawn apart. Coagulation time is the time between the skin puncture and appearance of the fibrin thread. At 25 C. or 77 F., the following values are considered normal: Dog, three minutes; pig, four minutes; hen, six minutes; cow, seven minutes, horse, 12 minutes. Temperature has an inverse relation to the coagulation time.

Modified Lee-White Method

Materials. Three clean tubes about 8 mm. in diameter, rinsed with physiological saline sol. (0.85% NaCl) are required.

Also necessary is a sterile clean syringe and needle rinsed as above.

Procedure. 1. Draw 5 ml. of blood from a vein, avoiding undue suction and tissue damage.

2. Withdraw needle from the syringe and gently transfer 1.0 ml. to each of the three tubes.

3. After two minutes, carefully tilt one of the tubes each minute to determine when a clot has formed. The clotting time is the average of the times for each tube. Normal values are 3 to 4 minutes longer than with the capillary tube method. (*q.v.supra.*)

Precautions. Tissue juices will markedly decrease the clotting time, so care must be taken to avoid squeezing or traumatizing the tissue excessively during drawing of the blood.

The rate of the coagulation reaction is affected inversely by the temperature, the rate of reaction doubling, within limits, for each 10 C. rise in temperature (Q_{10}). The test should, therefore, be run at a nearly constant temperature each time in order to obtain comparable values.

Glassware in the Lee-White method must be scrupulously clean prior to rinsing in saline, as soap or other agents affecting pH will markedly affect the results.

As indicated by Roberts,[3] a wide variety of agents when administered intravenously to the horse caused marked drops in the coagulation time. Previous medication should therefore, be considered in determining the coagulation time.

Finally, as stated by Gradwohl,[1] "Finding a prolonged clotting time should always initiate further investigation of disturbances in coagulation." These tests are for plasma deficiencies such as prothrombin, thromboplastin, fibrinogen, and for anticoagulants. For details of these tests see Gradwohl's[1] text.

REFERENCES

1. Gradwohl, R. B. H., Clinical Laboratory Methods and Diagnosis, 5th ed., C. V. Mosby Co., St. Louis, 1956.

2. Available from all. (One source mentioned for convenience.) Fisher Scientific Co., 2815 S. Jefferson, St. Louis 18, Mo., Cat. no. 5-962, about $3 per hundred.

3. Roberts, S. J., The Effect of Various Intravenous Injections on the Horse. *Am. Jour. Vet. Res.*, 4:226, 1943.

Soviet Veterinarians Tour the United States

A Soviet delegation in veterinary science visited the United States during September, at the invitation of the government. The six man delegation spent three days of their month-long tour through the Midwest in Kansas City visiting Haver-Lockhart and Jensen-Salsbery laboratories.

The Russians toured Jensen-Salsbery Laboratories and observed demonstrations on the use of various drugs now in the hands of veterinarians throughout the nation. Later the visiting group was hosted by the Kansas City chapter of the Missouri Veterinary Medical Association.

Included in the visiting group were:

Arkadity Arkadievich, member, Ministry Agriculture Collegium; Grigoriy Alekseevich Osipenko, vice-chief, All-Union Trust for Biological Industry; Leonid Lukoch Verteletskiy, chief, Veterinary Administration; Aleksandr Yakovlevich Dzerzhinshiy, director, Kazath Veterinary Research Institute; Sergei Razumovich Didovets, chief, Ukrainian Veterinary Administration; and Yakov Romanovich Kovalenko, director, All-Union Experimental Veterinary Institute.

The group visited various veterinary medical laboratories and other institutions to view processes and technics used in America.

The effect of tranquilizers are being noted by the group of Russian veterinarians who visited the United States in September. Research worker Rose Adjarian (l.) is making the demonstration at Jensen-Salsbery Laboratories.

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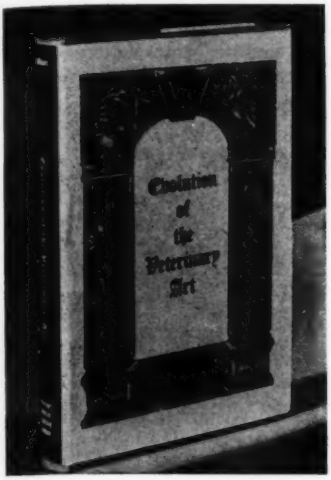

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*Quin, A. H., Our Professional Heritage, *Vet. Med.*, 50:519, 1955.

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Continued from page 618

Supplemental zinc produced a favorable response when used with a ration devoid of fish proteins, but failed when the same type of ration contained fish. This raises the question of zinc being at least a part of the inorganic or ash unidentified growth factor.

Zinc toxicity also deserves attention. One experimental group is known to be working with levels of zinc which are recognizably toxic to swine. Other groups may be conducting similar experiments.

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Goldfish and Tropical Fish

The exact count of goldfish and tropical fish in the United States is unknown. Goldfish, besides being kept as pets, are used extensively in the South for fishing bait. There are an estimated 50,000,000 goldfish and 125,000,000 tropical fish in the country. It must be remembered that goldfish are kept by many people who have just a few fish whereas tropical fish are kept in greater numbers by fewer keepers.

Tranquilizer for Swine

In reports published by the Canadian Department of Agriculture, (*Research for Farmers*) data are presented on seven sows that were savage or refused to accept their young at farrowing were treated with 200 mg. chlorpromazine. In all cases, sows relaxed and accepted their pigs within 40 minutes. Farrowings were normal. No after effects were evident in either sows or litters. After the effect of the drug wore off, sows calmly continued to rear their litters.

Illinois Nutrition Conference

The annual Nutrition Conference for Veterinarians, sponsored jointly by the Illinois State Veterinary Medical Association and the Illinois Feed Association, will be held November 19 at the Pabst Brewing Co. auditorium, Peoria, Ill. A well rounded program has been developed. It is directed to the veterinary practitioners' interests.

Also a Midwest Nutrition Conference for Veterinarians and Professional Nutritionists is being planned by the Midwest Feed Manufacturers Association in cooperation with local veterinary associations. The two day meeting will be held at the President Hotel in Kansas City, December 8 and 9.

These meetings afford veterinarians an excellent opportunity to get some important information on the lastest developments in nutrition and their application to everyday practice. Attendance at these meetings should be encouraged.

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No. 8 Handle (Stainless Steel) $2.00

Blades, per doz. $1.50

SURGICAL KNIVES BY Rudolph Beaver

WALTHAM 54, MASS.

This department will announce each issue new therapeutic items, equipment, services, and literature of interest to veterinarians. All claims made are those of the firms concerned. Send communications to the address noted.

Reader's Service

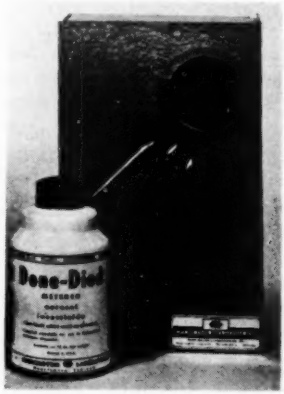
Your Family Pet is a quarterly magazine designed for distribution to clients by veterinarians. It is ethical in its approach and has the general approval of leaders in the profession. Complete information concerning the publication, including sample copies, can be had from Better Impression, Inc., Avenue of the Americas, New York 13, N. Y.

A Hematocrit Centrifuge (Model 31) is now in production which provides for practically noiseless operation. Included is a new hematocrit reader made of plastic with special

Chicago Surgical and Electrical

slide to provide easy reading of tubes. For full details, write for bulletin no. 326, Chicago Surgical & Electrical Co., 3070 W. Grand Ave., Chicago 22, Ill.

An Automatic Spraying Method eliminates the presence of flies, mosquitoes, gnats and other insects, according to release from



Huntington Laboratories

Huntington Laboratories. Using a non-toxic insecticide called Done-Died, minute doses are ejected into the air at regular intervals. Manufacturers claim tests prove this method to be 99% effective against most common insects. For details check with Huntington Laboratories, Inc., Huntington, Ind.

A Shampoo for Pets called Pooch-Poo is a mild formula that makes rinsing unnecessary because — unlike conventional products — no soapy traces remain to harm the eyes or hair, according to manufacturers' claim. The product is now being marketed to veterinarians in cases containing four gallons. Additional information may be obtained by writing Dept. C., Eastenn-Dukes Chemicals, Inc. Robersville, Tenn.

The First Compound in which polythionic acids, sulphur's most active form, has been stabilized in a balanced solution for veterinary use (Thionium—Jensen-Salsbery) is now available to the profession. It is recommended by the manufacturer for treatment of nonspecific dermatoses, seborrheic dermatoses, eczemas, and other fungal skin infections. For information check with Jensen-Salsbery Laboratories, 21st & Penn., Kansas City, Mo.

Healing of Infected Quarters of a cow's udder without disturbing the milking of other quarters is now possible with the use of a simple device now available to the profession. The Quarter Milker consists of an eight-quart trap with self-locking cover and handle, a four-foot section of duplex rubber milk hose and a team couple. The device is adjustable to any teat cup or automatic milking machine and is designed to meet all

Premium Dairy Engineering Co.

state sanitary laws. Manufacturers claim that spread of mastitis can be lessened since regular teat cups are not used to milk infected quarters, thus eliminating the carrying of bacteria from one cow to another. Milk can be trapped from the infected quarter, and discarded in such a way as to prevent further spread of bacteria. For more details check with Premium Dairy Engineering Co., Salem, Ore.

Complete **Analysis of Amino Acid Samples** in 24 hours or less is possible with a new research instrument that quantitates and qualitates the 20 or more amino acids most commonly found in protein hydrolysates.

... revolutionary

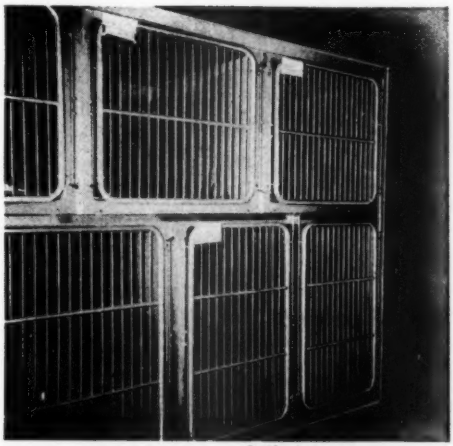
new manufacturing

technics mean

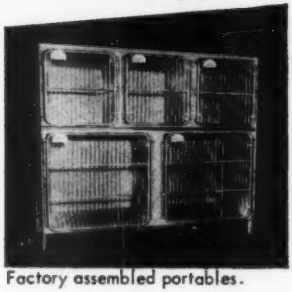
new **LOWER PRICES**

for the time-tested

glass-plastic cage



Built-in cages



Factory assembled portables.

Before you install new cages WRITE TODAY for complete information on these modern cages by Kirschner . . time-tested—molded, seamless construction, minimum maintenance. Equipped with the door built to last a lifetime.

Kirschner

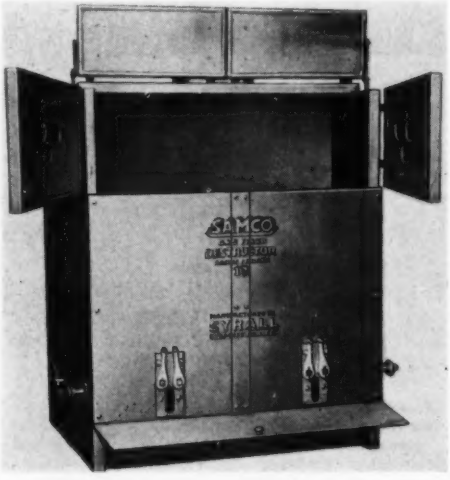
MANUFACTURING COMPANY
Vashon, Washington

Complete information on the instrument may be obtained by writing Spinco Division, Stanford Industrial Park, Palo Alto, Calif.

Lifespan Kleen Odor is a deodorant-cleaner and **Lifespan V-B-S** is a germicide, both now available to the profession through National Canine Products Inc. For details and literature, ask the firm at 70-10 74th Street, Middle Village 79, N. Y.

Hog Houses is a USDA publication that describes various types of housing, ventilation, insulation, feeding, watering, floors, farrowing stalls, brooders and movable houses. Ask the government printing office, Washington 25, D. C. for Misc. Pub. no 744 as described above.

A large capacity **Gas Fired Creamatory Destructor** with double burner equipment is now available. Extra large opening (45 in. x 20 in.) is provided through hinged front door opening and top panel raising which makes it desirable for handling of large animal carcasses and other material directly to combustion chamber with little effort.



Unit is portable and shipped completely assembled ready for rapid, economical installation. For details ask Syrall Manufacturing Company, 511 North State Street, Syracuse, N. Y. Mention Samco #17.

"Call Your Veterinarian First"

Farmers are showing high reader interest in the current series of farm magazine ads on the theme "Call Your Veterinarian First," which is being sponsored by member companies of Associated Veterinary Laboratories.

Readership surveys recently made public reveal that the series has ranked first in several categories of readership measurement. In other surveys, these ads consistently have ranked far above the average in readership.

The campaign is proving so effective for the veterinary profession that member companies of Associated Veterinary Laboratories have voted to continue it for another year.

Forces Against Mastitis

The American Veterinary Medical Association and the American Dairy Science Association have formed a joint committee to promote dairy herd health.

The initial meeting was held in the Chicago offices of the A.V.M.A. and included five representatives from each organization. The ten man committee will act as a clearing house for health problems presented by both group, and appoint subcommittees to study the problems and recommend action.

As a result of the first meeting, two subcommittees were formed; the first will study the needs for research in mastitis and formulate a control program adapted to conditions in all states.

The second committee will study means by which the two organizations can work more closely to accelerate the nationwide bovine brucellosis eradication program.

PORTABLE DOG PENS

LOW PRICES!

Sectional design. Strong, rugged. Long life. Welded galvanized pipe frame and chain link fence. Sturdy gates. many sizes. Priced at $39.00 and up. Freight paid. Also pens made to order. Write for circular and prices.
BRINKMAN MFG. CO.
5401 W. 21 St. Dept. 16118
Topeka, Kan.

A "PRESCRIPTION DIET"

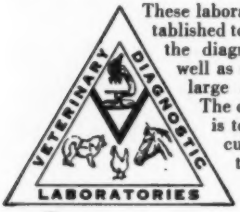
p/d

FOR FEEDING INDIVIDUAL PATIENTS

PRESCRIPTION DIETS DEPT., HILL PACKING CO., TOPEKA, KANSAS

k/d p/d r/d i/d c/d f/d

Laboratory Service for Veterinarians



These laboratories have been established to aid veterinarians in the diagnosis of obscure as well as common ailments in large and small animals. The chief aim of our staff is to give quick and accurate diagnosis at all times.

Our service includes fecal examinations, anti-biotic sensitivity tests, urinalyses, blood counts, tissue sections, bacteriological cultures, cultures for ringworm and blood chemistry. It is designed to assist owners and breeders of stock of all kinds including dogs, cats, horses, cattle, poultry, hogs and sheep.

Sample containers and price list on request.

VETERINARY DIAGNOSTIC LABORATORIES

3 East 65th St., New York 21, N.Y.
Telephone: LEhigh 5-9188

Anthrax Outbreaks

The Agricultural Research Service reported outbreaks of anthrax in Arkansas and Louisiana during June 1958.

In Arkansas the outbreak occurred in an endemic area where regulatory officials have had considerable experience with the disease. Only a few small herds in the area had not been vaccinated. These are now being vaccinated at the owners' expense using a noncapsulated anthrax spore vaccine. In Chicot County, 12 swine, ten mules, and four cattle were reported to be affected in a total of nine herds. In Ashley County the disease was reported in eight swine and five mules in five herds.

In Louisiana anthrax was reported in cattle in ten counties. These counties were placed under state quarantine. There have also been cases in swine and equines. One case of cutaneous anthrax was reported in a man employed by a rendering plant. Animals are being vaccinated at the owners' expense, largely with a noncapsulated anthrax spore vaccine. The outbreak began early in June.

CURTS **AKRA-SCOUR** CURTS

"Jumbolus"

Sulfonamides combined with accepted coagulants, adsorbents detoxicants and antacids
For the treatment of diarrheas in larger calves and adult cattle

Phthalylsulfacetamide (30 gr)—sulfonamide of choice in enteric infections
Sulfathiazole (30 gr)—routinely used in treatment of scours
Akrodin® (60 gr)—widely used in treatment of bloody scours
Magnesium trisilicate (60 gr)—a preferred detoxicant, adsorbent and antacid
Tannins (100 gr)—adsorbent and coagulant, essential in reducing fluidity of stool
Alumina gel (100 gr)—adsorbent, coagulant, detoxicant and antacid

Suggested dose: 1 **AKRA-SCOUR** "Jumbolus" per 350 pounds body weight (3 per 1000 lb.) the first day, and 1 per 500 pounds the second day. Continue or repeat as necessary.

Fits usual "equine" balling gun. Creased for fractional dosage.

Package: Box of 50 "Jumboluses"

order from your nearest CURTS distributor or direct

CURTS Laboratories, Inc.

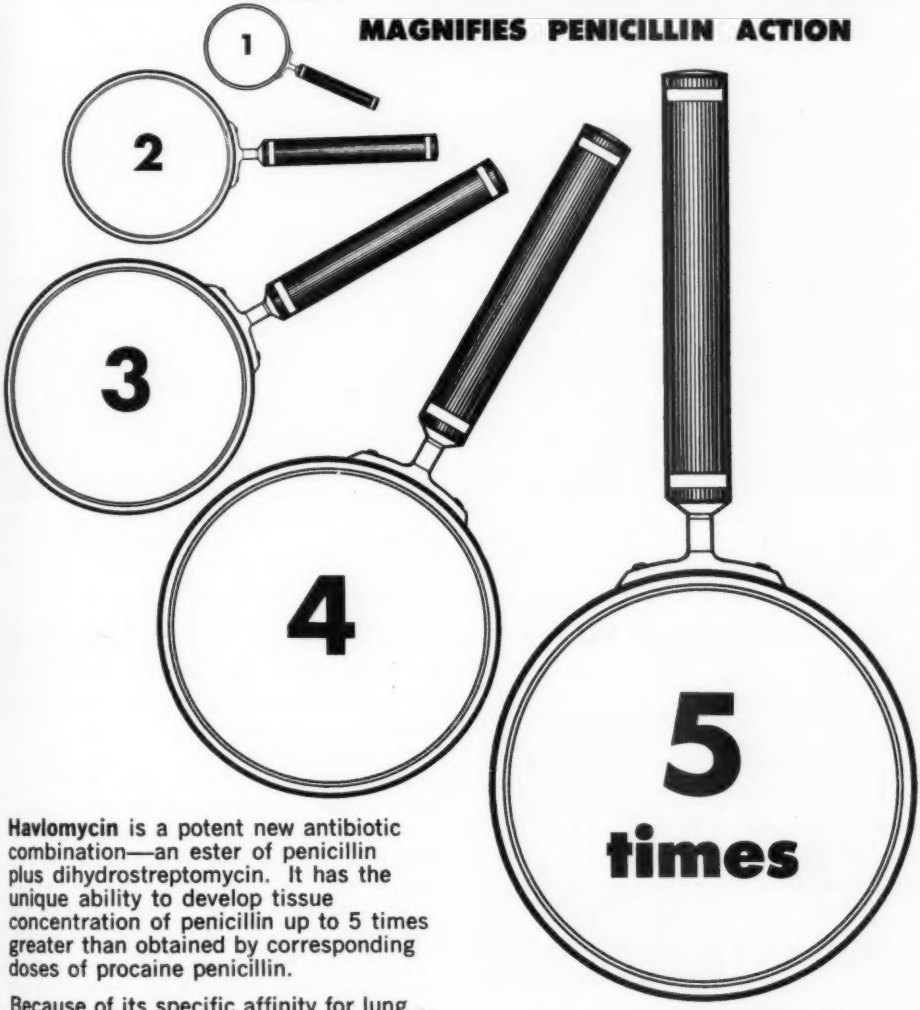
Manufacturers of Veterinary Pharmaceuticals Since 1918

71 Central Avenue Kansas City 18, Kansas

NEW

HAVLOMYCIN

MAGNIFIES PENICILLIN ACTION



Havlomycin is a potent new antibiotic combination—an ester of penicillin plus dihydrostreptomycin. It has the unique ability to develop tissue concentration of penicillin up to 5 times greater than obtained by corresponding doses of procaine penicillin.

Because of its specific affinity for lung and mammary tissues, Havlomycin is quick and effective for respiratory infections in large and small animals and for **intramuscular** mastitis therapy.

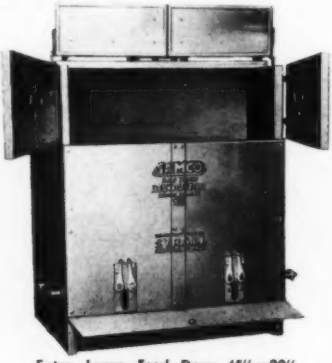
Dosage: large animals, 1 cc. per 100 lb. body weight once daily for 2-4 days.
small animals, 0.5 cc. to 1.5 cc. once daily for 2-4 days.

Supply: 10 cc. vial with vial of sterile diluent.

HAVER-LOCKHART
LABORATORIES

Kansas City, Missouri

SAMCO
CREMATORY DESTRUCTOR
Gas Fired for
ANIMAL CARCASS CREMATION
(Engineered Special for Veterinary Practitioner)



Extra Large Feed Door 45" x 20"
Capacity 17 Bushel — 2 Burners
100% SAFETY AUTOMATIC
THERMO PILOT VALVE
Each Main Burner with Pilot Light and Timer Shut-off.
GREAT HEAT and FIRE POWER
Smaller Sizes Available
Investigate unique purchase plan for great savings
SYRALL MFG. CO., 511 N. State, Syracuse 3, N.Y.

6 Reasons Why!

1. IT'S DEPENDABLE — Powerful, Universal Motor for any 110 volt current, without adjustment.
2. IT'S SAFE — Shockproofed, ribbed bakelite housing provides sure grip.
3. IT'S COMFORTABLE — Light — only 20 oz. — easy to hold, easy to use.
4. IT'S VERSATILE — Six different blades for every type of clipping and surgical shaving.
5. IT'S SMALL SIZE — Facilitates handling in hard-to-get-at- places — the underbody, flanks, head, face and ears.
6. IT'S HUMANE — Runs smooth, quiet, cool — eases animal tension and fear.

John Oster MANUFACTURING COMPANY
Milwaukee 17, Wisconsin, U.S.A.

Get Oster The Clipper Worthy Of Your Skill

Dr. Frick and the Finnish Sauna

For years I have heard of the Finnish sauna and I had seen pictures of hardy Finns coming out of steam houses and rolling naked in the snow or diving into icy lakes. This summer while attending the Nordic Veterinary Congress at Helsinki, I decided to experience a sauna. The roof of the Palace Hotel was advertising saunas, so I made an appointment, and at 4:00 p.m. July 24 I arrived at the desk two floors above our hotel room overlooking the harbor.

A beautiful golden haired 19 or 20 year old girl with the most lovely deep blue eyes and with features your eyes just wanted to feast upon was the receptionist. She spoke very little English but I made it clear I was expected. That was the last thing I made clear while I was on that roof.

I was motioned into a hallway by a husky heavy-bodied woman about 40 years old who somehow impressed me she belonged to the Volga Boatman's Union. She took me to a room and motioned to me to take off my shirt. I did. She motioned me to strip to the waist. I did. She was still adamant, so I removed my shoes and stockings. She motioned she wanted my trousers. She got them. And she proceeded to help me remove all I had left.

Then she led me to a dark wood walled room with a glass door and a wooden rack berth. It was hot in there. She motioned me to get on the rack. The wooden walls were hot and she wet down part of them with a bundle of green-leaved birch brush that she would dip into a bucket of water. Then she left me and I lay there with the bundle of brush as a pillow. Soon it got hotter — not just warm but hot. The walls were too hot to touch. The heat was moist but I expected to see a red man emerge from behind a puff of steam the way the devil appears in *Faust*. It was hard to breathe. The sweat streamed out of all my pores and some that had not functioned for years were working overtime.

I thought of Russian torture chambers and how best to vanish Houdini-like into thin air. I could excuse myself by feigning a bad heart, but my manly pride was not to be sullied. I'd stay there even if I died!

Continued on page XLIII

New VARIZYME® gives you a way to get at "walled off" infections

STREPTOKINASE—HUMAN PLASMINOGEN—STREPTODORNASE

Dog with chronic, generalized, bacterial dermatitis. Nose lesion was 4 years old—treated with ointments, antibiotics, lotions and cautery without effect.

Same dog one month later following 5 days' treatment with VARIZYME and POLYOTIC Tetracycline intravenously followed by soothing ointments topically.

VARIZYME is a stable, vacuum-dried powder containing two streptococcal enzymes and plasminogen of human placental origin.

By enzymatic action VARIZYME liquefies fibrin, clotted blood and viscous exudates. Use VARIZYME to reverse inflammatory process and remove inflammatory barrier.

USE VARIZYME INTRAMUSCULARLY, INTRAVENOUSLY, BY INFUSION, BY IRRIGATION AND AS WET PACKS.

VARIZYME is indicated for abscesses, slow-to-heal wounds, edema, ulcers, cellulitis and hematoma and other inflammatory conditions. It is used in the treatment of pneumonia, chronic cough, otitis, metritis, mastitis, dermatitis, foot rot, actinomycosis and sinusitis.

VARIZYME should be accompanied by systemic antibiotic therapy – POLYOTIC® Tetracycline or AUREOMYCIN® Chlortetracycline.

Available only to Veterinarians.

VARIZYME®

Streptokinase—Human Plasminogen—Streptodornase Vacuum Dried for Parenteral and Topical Use

Quantity	Package
12 or 36	12,500 Units Vials
12 or 36	125,000 Units Vials

CYANAMID

VETERINARY PROFESSIONAL SERVICE DEPARTMENT
AMERICAN CYANAMID COMPANY, NEW YORK 20, N. Y.

MASON'S New KENNEL RUNS
NOW AVAILABLE
For SMALL ANIMAL HOSPITALS
Quickly Erected - NO POSTS REQUIRED
Can be set on concrete or wood floors or directly upon the ground, joining in, or independent of Building. Composed of strong, self-supporting Fence sections and Gate Units with GATES BUILT-IN and Lockable Latches.
FREE CATALOG
Send for Free Catalog with Low Direct Factory Prices of Kennel Fences of all kinds, Kennel Doors, Cages and Hospital Equipment.
THE MASON FENCE CO., Box 77, LEESBURG, OHIO

Its a Keet

Most dictionaries will not provide the information, but once in a while a veterinarian may be called upon to supply the term for a baby guinea. The answer, of course, is: "It's a *keet*."

"Short Unhappy History"

According to a recent article, in the *New York University Alumni News*, New York University had a short and unhappy history. It all began in 1899, when the university council petitioned the state legislature to aid the newly merged New York College of Veterinary Surgery and the American Veterinary College: "New York City is and ought to be the most important center of veterinary science in the United States." The aid was not forthcoming.

"In 1913 the legislature decided the school would be the state veterinary college for Eastern New York . . . Even then, however, no funds were forthcoming . . . By 1919 the college had the largest number of veterinary teachers in the country but of the 48 members of the faculty, only seven received salaries."

Dr. W. Horace Hoskins, the school's third dean, finally obtained a grant for the college in 1920, but it was not renewed in 1921. Hoskins died in the summer of 1921 and the school ceased to exist in 1922.—*Kenneth B. Haas, D.V.M.*

tested medicinals direct by mail

10cc Procaine Penicillin — Aqueous Suspension 300,000 Units per cc	10 Vials	$ 3.10
	100 Vials	28.95
	1000 Vials	279.00
10cc Procaine Penicillin — 400,000 Units with ½ gm. Dihydrostreptomycin in each 2 cc Aqueous Suspension	10 Vials	6.35
	100 Vials	58.00
	1000 Vials	560.00
1 Vial — Penicillin G Powder — 500,000 Units each	10 Vials	1.60
	100 Vials	15.00
	1000 Vials	140.00
10cc Dihydrostreptomycin Solution — ½ gm. per cc	10 Vials	6.25
	100 Vials	57.00
	1000 Vials	550.00
5gm. Dihydrostreptomycin Powder	10 Vials	6.25
	100 Vials	57.00
	1000 Vials	550.00
Tetracycline Capsules 250mg.	100	22.49
	5x100	110.00
Penicillin Tablets — Soluble — 100,000 Units	100	1.45
	1000	12.00
	5000	53.00
Penicillin Tablets — Soluble — 200,000 Units	100	2.50
	1000	22.00
	5000	104.00
Penicillin with Triple Sulfas — 300,000 Units	100	4.95
	1000	47.50
Achromycin V Capsules 250mg — Lederle	100	27.50
5cc Acth-Gel — 40 units per cc Standard Brands	1 Vial	2.65
	10 Vials	24.50
	100 Vials	235.00
5cc Acth-Gel — 80 units per cc Standard Brands	1 Vial	4.95
	10 Vials	46.00
	100 Vials	440.00
Prednisone or Prednisolone — 5mg — Specify	100	6.50
	1000	62.00
	5000	285.00
10cc Vitamin B_{12} — 1000 MCG per cc Crystalline — U.S.P.	1 Vial	2.50
	10 Vials	23.00
	100 Vials	220.00
	1000 Vials	2100.00

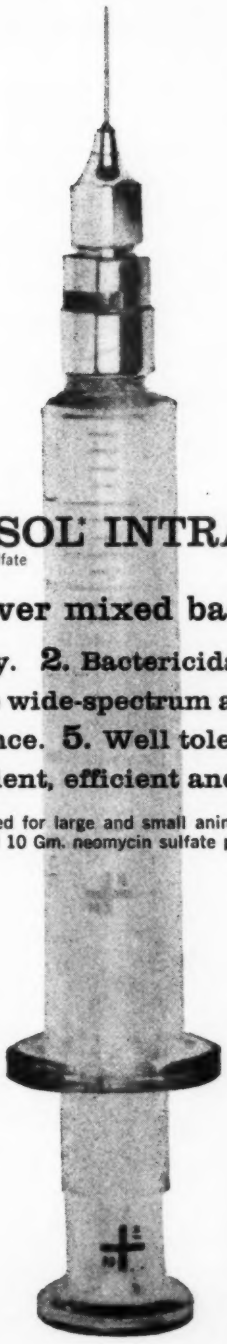
Minimum Shipping Order $25.00. Postage prepaid. Check with order.

VETERINARY MEDICINE SUPPLY CORP. 130-05 LIBERTY AVENUE, RICHMOND HILL, N. Y.

Cable: Herblews New York Phone: Michigan 1-5650 Prices subject to change without notice.

nationally known antibiotics, therapeutics, hormones, biologicals, vitamins and pharmaceuticals for all animals

NEW



STERILE BIOSOL* INTRAMUSCULAR
neomycin sulfate

Greater control over mixed bacterial infections

1. Unexcelled stability. **2.** Bactericidal, kills most susceptible bacteria. **3.** True wide-spectrum antibiotic. **4.** Discourages bacterial resistance. **5.** Well tolerated...nonirritating to tissues. **6.** Convenient, efficient and economical.

Three practical dosage forms tailored for large and small animals. Available in rubber-stoppered vials containing 0.5 Gm., 5 Gm., and 10 Gm. neomycin sulfate per vial.

*TRADEMARK

Upjohn

Veterinary Division
The Upjohn Company
Kalamazoo, Michigan

new "far superior" treatment for retained placenta

Therapeutic failure, frequently encountered in retained placenta, can be prevented—with new FUREA Veterinary which combines the potent wide-range bactericidal and deodorizing action of FURACIN* (brand of nitrofurazone) with the cleansing action of urea. FUREA Veterinary boluses disintegrate readily and are nonirritating and nontoxic.

In retained placenta, treatment with FUREA has produced quick improvement of the general condition of the cow with lessening or elimination of malodor. Fertility rate remained unimpaired in over 90% of treated cows.*

SUPPLIED: Each bolus contains 0.12 grams of FURACIN and 12 grams urea. Bottle of 25.

DOSE: Two boluses inserted into the recently pregnant horn. One bolus may be placed in the non-pregnant horn.

*Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

For vaginal infections, including those caused by Vibrio fetus, that may prevent conception, or cause abortion, dispense: FURACIN Suppositories Veterinary, large. Box of 12.

FUREA™ VETERINARY

AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR

new specific treatment for calf scours

Developed specifically for the control of calf scours, new ENTEFUR provides rapid, effective and safe treatment. ENTEFUR drastically cuts mortality.[1,2] In one study, 60 of 63 ENTEFUR-treated calves survived, whereas in the control group only 3 of 24 calves lived.[2] "ENTEFUR treatment appeared the only factor modifying significantly the course and outcome of the disease."[2]

ENTEFUR contains the new nitrofuran, Furamazone® (brand of nifuraldezone) for rapid wide-spectrum bactericidal action against gram-positive and gram-negative enteric bacteria. ENTEFUR also contains bismuth subsalicylate for its mildly astringent, antidiarrheal action.

ENTEFUR BOLUS VETERINARY, small, contains: Furamazone 1 Gm., bismuth subsalicylate 0.26 Gm. Dosage: 1 bolus twice a day for 2 days. Supplied: Box of 24 (6 envelopes of 4 boluses each).

REFERENCES: 1. Bull, W. S.: N. Amer. Vet., In press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., In press.

ENTEFUR™

NOW AVAILABLE THROUGH YOUR PROFESSIONAL VETERINARY DISTRIBUTOR

EATON LABORATORIES, NORWICH, NEW YORK

The dangerous, disconcerting interruption in surgery can make the difference between success and failure for the veterinarian—life or death to the patient. And it's an extremely rare occurrence with a reliable, safe anesthetic like

short-acting

NEMBUTAL®

(Pentobarbital, Abbott)

Practicing veterinarians over a quarter century have learned to depend on the uniformity and purity of this short-acting anesthetic. When you use it, Doctor, you'll find—

Onset of action is prompt—surgical hypnosis being achieved in just 3 to 5 minutes from a single intravenous dose.

Degree of cerebral depression and duration of anesthesia are easily controlled, lasting from 45 to 90 minutes.

Optimal skeletal muscle relaxation accompanying NEMBUTAL anesthesia facilitates surgery; interruptions during procedures are rare.

Side effects are minimal with safe, easy-to-use NEMBUTAL; and there is little danger of cumulative effect with this short-acting agent.

Order safe, reliable, uniform NEMBUTAL from your Abbott representative, your distributor or from Veterinary Division, Abbott Laboratories, North Chicago, Illinois.

Abbott

604069

DR. FRICK and the FINISH SAUNA

Continued from page XXXVI

Meantime I could hear my attendant whistling the largo from *Death and Transfiguration* outside my door. I'm sure she had forgotten me completely. Finally when my brain was too tired to remember, she opened the door, came in and took the bundle of switches and began to beat my legs and arms, back and front. A stinging sensation pervaded my being, and a mint like odor filled the air.

I was then motioned outside and warm water was showered over me. Next I was beckoned to another rack and she proceeded to soap me and rub me with a brick shaped rough turkish towel. She missed no little part of me and nothing was private. I was scrubbed from head to between the toes, front and back. My skin was scraped, rubbed and polished. My head was shampooed until there was a question whether all the hair would pull out or rub off. A full bucket of water was poured on my face and after all this I was pushed back into the hot room for five minutes more of baking and boiling.

When I was removed the second time I didn't know or care what they did, but I think I got another shower, was dried off and put into a big turkish towel-like dressing gown, told to lie down and she opened the door wide on the eleventh floor of the roof garden to let in the cool harbor breeze. Sometime later she came in and pointed to my clothes. I dressed, hurried back to my wife who asked me why my eyes were so bloodshot! In spite of it all I felt really fine and stimulated.

Gar sa gud,
—*E. J. Frick, D.V.M.*

Discovery is Dead

Discovery, the 27 year old patriarch of Alfred G. Vanderbilt's Sagamore Farm and granddad of Native Dancer and Bold Ruler, was destroyed "due to infirmities of advanced age," ending one of racing's most illustrious careers. Bought by Vanderbilt for $25,000. as a two year old, the weight-toting chestnut earned $197,287. and sired winners of $5,625,643.

B-P
HALIMIDE*
the CONCENTRATE with the TWOFOLD ACTION
For Instrument Disinfection

BACTERICIDAL
—when diluted with water (except the tubercle bacillus)
TUBERCULOCIDAL *also*—
when diluted with alcohol

**Trademark of Bard-Parker Co., Inc.*

***PLUS**—these other important advantages . . .*

NON-CORROSIVE
—No anti-rust tablets to add.
STABLE
—Need not be changed frequently.
ECONOMICAL
—1 oz. makes 1 gal. of solution.

Bard-Parker HALIMIDE is the result of years of research to develop a concentrate combining maximum bactericidal potency and trouble-free performance. IT'S ECONOMICAL . . . *any way you look at it!*

LIST PRICE
4 oz. bottle..... **$2.50**
Please ask your dealer for quantity discounts.

B-P INSTRUMENT CONTAINER No. 300
Of stainless steel and PYREX glass with airtight cover. Ideal for use with B-P HALIMIDE.

PARKER, WHITE & HEYL, INC.
Danbury, Connecticut

HALIMIDE and your INSTRUMENTS . . . THEY COMPLIMENT EACH OTHER

for "double-barreled" action in

canine diarrheas

and

calf scours

entromycin

TRADE MARK

*Now available in 3 convenient forms**

combines . . .

Carob Powder—for fast-acting antidiarrheal action . . . remarkably effective intestinal astringent, demulcent, toxin absorbent and protectant action. Proved in human practice through control of infectious diarrhea in infants.

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References: 1. Kakavas, J. C.; Roberts, H. D. B.; de Courcy, S. J. and Ewing, D. L.: J. Am. Vet. M. Ass. 119:203 (Sept.) 1951. 2. Kakavas, J. C.: Antibiotics Annual 1954-1955, New York, Medical Encyclopedia, Inc., 1955, p. 323. 3. Mires, M. H. and Chadwick, R. H.: Vet. News 10:3 (Jan.-Feb.) 1947. 4. Mires, M. H.: J. Am. Vet. M. Ass. 117:49 (July) 1950. 5. Mires, M. H.: Vet. News 14:9 (May-June) 1951. 6. Roberts, H. D. B.; Kakavas, J. C. and Biddle, E. S.: N. Amer. Vet. 34:247 (April) 1953.

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Veterinary Calendar

Oct. 12-14. **Florida State Veterinary Medical Association,** annual meeting. Galt Ocean Mile Hotel, Ft. Lauderdale, Florida. Dr. A. R. Chambers, 6116 Main St., Jacksonville, Fla., secretary.

Oct. 16-17. **Eastern Iowa Veterinary Medical Association,** Annual Meeting. Hotel Roosevelt, Cedar Rapids, Ia. Dr. F. E. Brutsman, Traer, Ia., secretary.

Oct. 25. **Kansas State College,** Student Chapter of the American Veterinary Medical Association, annual Open House. (9:00 a.m. to 9:00 p.m.) John P. Seacat, student member of the Publicity Committee.

Oct. 26-29. **Southern Veterinary Medical Association,** Claridge Hotel, Memphis, Tennessee. Dr. A. A. Husman, Raleigh, North Carolina, secretary.

Nov. 4- 7. **United States Livestock Sanitary Association,** 62nd annual meeting. Hotel Deauville, Miami Beach, Florida. Dr. Ralph Hendershott, executive secretary.

Nov. 5- 6. **Mississippi Valley Veterinary Medical Association,** annual meeting. Pere Marquette Hotel, Peoria, Ill. Dr. W. P. Hendren, Carthage, Ill., secretary-treasurer.

Nov. 12-13. **Midwest Small Animal Association and A.A.H.A.** Regional Meeting. Hotel Burlington, Burlington, Iowa. Dr. J. Porter Coble, 2828 S. MacArthur Blvd., Springfield, Ill., secretary.

Jan. 26-28. **Minnesota State Veterinary Medical Society,** annual meeting. Leamington Hotel, Minneapolis, Minn. Dr. B. S. Pomeroy, secretary-treasurer.

Jan. 27-28. **Maryland State Veterinary Medical Association.** Winter Meeting. Emerson Hotel, Baltimore, Maryland. Dr. Harry L. Schultz Jr., Baltimore, Md., secretary.

Feb. 2- 4. **California Veterinary Medical Association,** annual Midwinter Conference. School of Veterinary Medicine, University of California, Davis.

Antibiotics in Poultry Feed

Controlled tests conducted by the USDA at its Glendale, Arizona station concerning the addition of an antibiotic to the laying ration of hens during hot weather revealed that presence of the antibiotic increased egg production by almost one-third. Feed efficiency was also improved. The antibiotic, chlortetracycline, was used at the rate of 50 to 100 gm. for each ton of feed.

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Gandal to Bronx Zoo Post

The appointment of Dr. Charles P. Gandal as Veterinarian of the New York Zoological Park has been announced by the New York Zoological Society. Dr. Gandal was graduated from the New York State Veterinary College at Cornell in 1951. He was in general practice in Red Bank, New Jersey, for six months and became Assistant Veterinarian at the Zoological Park (Bronx Zoo) at the beginning of 1952. He was named Associate Veterinarian in 1956, and Veterinarian earlier this year when Dr. Leonard J. Goss, the Zoo's Veterinarian, resigned to become Director of the Cleveland Zoo.

New Cholera-Like Virus

Discovery of a previously unknown lethal virus disease of swine has been reported by Naval Biological Laboratory workers on the Berkeley Campus, University of California. The disease has some of the characteristics of each of two other lethal swine diseases—hog cholera and African swine fever.

The new virus was discovered during a search for a vaccine for vesicular exanthema. After growing large amounts of vesicular exanthema virus in kidney tissue cultures of a single hog, workers injected the resulting vaccine into hogs.

Hogs were to be protected against vesicular exanthema; instead, all died of a new disease. Further studies of the new virus are now in progress at the university.

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Veterinary Nutrition Conference

The Annual Nutrition Conference for Veterinarians sponsored by the Illinois State Veterinary Medical Association with the assistance of the Illinois Feed Association will be held in the Pabst Brewing Company Auditorium, Peoria, Ill., Wednesday, November 19. This one day meeting is designed to give the practicing veterinarian information which he can use in his practice. The program is as follows:

9:00 Registration—Fee $5.00 (this includes noon meal).

10:00 Greetings—Dr. Morris Erdheim, Chairman of the Illinois State Veterinary Medical Association Nutrition Committee.

Welcome—Dr. Thomas M. Wise, President of the Illinois State Veterinary Medical Association.

Introduction of—Mr. Alvin W. Lovekamp, President of the Illinois Feed Association.

10:30 Beef Cattle Nutrition—Dr. O. Burr Ross, Head of the Dept. of Animal Science, University of Illinois.

11:10 Bloat Control in Dairy Cattle—Dr. Roy Nichols, Department of Veterinary Science, University of Wisconsin, Madison, Wisc.

12:00 Noon Luncheon—Master of Ceremonies, Cy Sievert, Consulting Nutritionist, Chicago, Ill.

1:30 Introduction of—Mr. Elmer Roth, President of Illinois Feed Sales Managers Association.

1:45 Swine Nutrition Research—Dr. D. E. Becker, Associate Professor Animal Science, University of Illinois, Urbana, Ill.

2:25 The Nutrition and Feeding of Dogs—Dr. Victor Heiman, Director Animal Nutrition Dept., Corn Products Refining Company, Waverly, N. Y.

3:15 Panel: Medicated Feed Additives: In Feed Manufacturing—Mr. A. T. Myren, Sales Manager, Faultless Milling Company, Springfield, Ill.

To Combat Stresses—Dr. Ray Klussendorf, Director of Veterinary Medical Services, Commercial Solvents, Corp., Terre Haute, Ind.

In Veterinary Practice—Dr. James Allen, Director of Field Services, McMillen Feed Mills, Decatur, Ind.

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Avian Leukosis Virus

From current literature we learn that the etiological virus of avian leukosis has now been physically demonstrated by means of the electron microscope. The virus is in the nature of particles 90 millimicrons in diameter that stain easily with osmium or osmic acid. In addition to virus shedding by ova, presence of the virus has now been demonstrated in saliva and feces of infected and carrier fowl.

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Captain Judy Retires

Captain Will Judy, publisher and editor of Dog World, retired September 10 after 36 years of service. Captain Judy purchased Dog World as a seven year old journal from its founder. Dr. Fred Formaneck and Capt. Judy edited the first issue January 1923. With his last issue, October 1958, his editing career embraced 426 issues of the magazine.

Captain Judy, although entirely separated from Dog World as editor, continues his interest in dog matters as president of National Dog Week, chairman of the Oldtimers of the Kennel World, and writer of the newspaper syndicated dog feature, Dog Comments.

Dr. Goeffrey Boyd Retires

Dr. Geoffrey A. Boyd, chief of the Bureau of Meat Inspection, California Department of Agriculture, has retired. Doctor Boyd is a graduate of Colorado State University. He was formerly a practitioner, and an official with the USDA.

The Surgeon's Attributes

Merillat's description of the veterinary surgeon's attributes (*Veterinary Surgery*, vol. 3, p. 11) is unparalleled in modern veterinary literature:

"In diagnosis, in preparation of the patient, in performance of the operation and in the post-operative treatment, the careful, painstaking, methodical and studied execution of minute details is consecrated as an absolute law by the experienced surgeon. Theoretical knowledge, inventive genius and practical adaptability are resources par excellence, but of all these various attributes heralded as essential to success in surgery, attention to details stands conspicuously first. The surgeon who has animals for his patients might also profitably possess the health of an athlete, the strength of a giant, and the manipulative dexterity of a magician and the skill of an artisan, and as Moller once so aptly put it, 'He should know how to deport himself in the pig-sty as well as in the parlor.' "

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Federal Veterinarians Needed

The Agricultural Research Service has an urgent need for over 150 veterinarians in its Meat Inspection Division at various locations throughout the country. These vacancies will be filled at the GS-7 and GS-9 grade levels, depending upon the qualifications of applicants. Current entrance salaries for veterinarians at these grade levels are $5,430. and $6,135. per annum, respectively.

Veterinarians with less than one year of professional experience will be appointed in grade GS-7 at the salary rate of $5,430. per annum. Those with one year or more of professional veterinary experience will be appointed in grade GS-9 with a salary rate of $6,135 per annum. Moreover, veterinarians initially appointed in grade GS-7 will have excellent opportunities for advancement to grade GS-9 at $6,135. per annum upon the satisfactory completion of six months of service and training in the Agricultural Research Service.

Veterinarians interested in federal employment are encouraged to contact the Personnel Division of the Agricultural Research Service, USDA, Washington 25, D. C.; or they may contact the nearest federal veterinarian in charge of Meat Inspection or of livestock disease control and eradication activities.

National Swine Industry Conference

Many veterinarians are planning to attend a nationwide swine industry conference to be held at Purdue University, Lafayette, Ind., Nov. 3-4, 1958. Leaders in all fields including marketing, breeding, grading, disease control, etc., will present lectures and various "work-shop" sessions will provide essential guide lines for future expansion and profit levels of the huge swine industry. For program and housing details, communicate with Dr. Earl Butz, dean, School of Agriculture, Purdue.

The meeting promises to be one of signal importance to the industry, and should be of interest not only to veterinarians, but to members of the industry as well.

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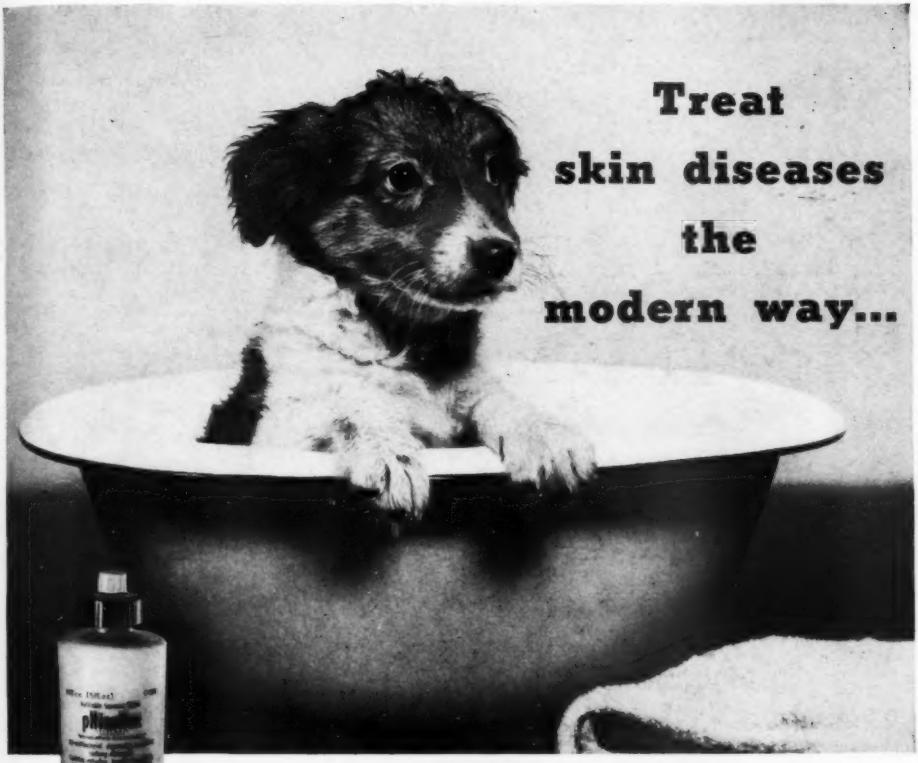

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